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Bitterns in the UK

Eagle Owls in Doñana

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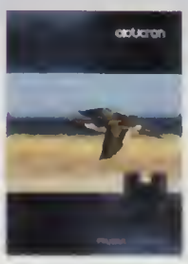




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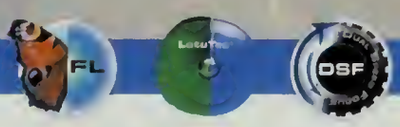
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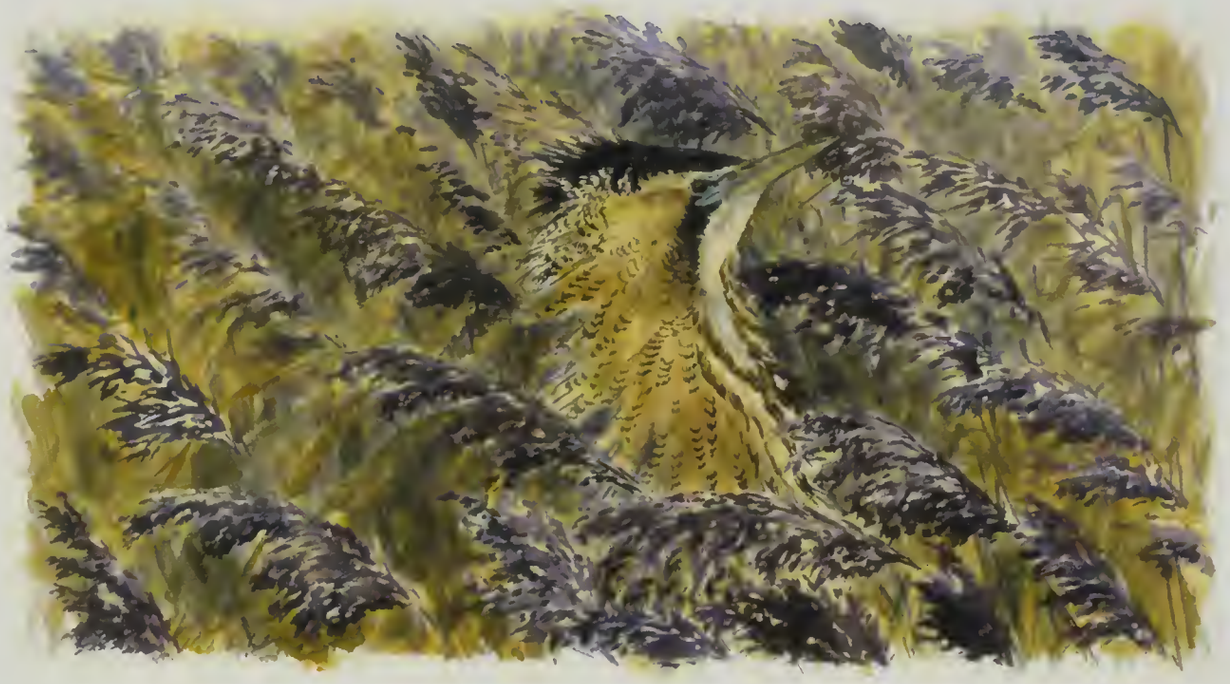
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Bitterns and Bittern Conservation in the UK

Andy Brown, Gillian Gilbert and Simon Wotton



Ben Green

Abstract Once widespread and even locally numerous across the lowlands of the UK, the Eurasian Bittern *Botaurus stellaris* had been extirpated by a combination of habitat loss and persecution by the late 1880s. After the species returned, at the start of the second decade of the twentieth century, numbers increased to a peak in the 1950s, before falling precipitously to a low point in 1997, when the population was only just into double figures. Extinction – for a second time – was averted only by a concerted conservation effort to restore the larger reedbeds which still contained Bitterns and those from which the birds had most recently been lost. A programme to create extensive new reedbeds also began at this time, with both efforts supported by detailed research, which identified the key factors affecting reedbed use by Bitterns. To date, Bittern numbers have responded well, though work continues to refine our knowledge and to identify the benefits to other wildlife of management aimed at further increasing Bittern numbers and productivity. But the future of Bitterns in the UK is far from secure, with climate change, through sea-level rise and drying in the southeast, threatening to undermine much that has been achieved. A reinvigorated reedbed creation programme is now underway, which should provide a secure future for Bitterns in the UK. This paper tells the full story of Bitterns and of the Bittern conservation effort in the UK.

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Bittern distribution and numbers prior to national extinction

The Eurasian Bittern *Botaurus stellaris* (hereafter 'Bittern') is widespread across Europe, central and southern Asia and North Africa. It is nowhere numerous, being almost wholly confined to a scarce, fragmented and declining habitat – large freshwater wetlands, usually, but not exclusively, dominated by stands of Common Reed *Phragmites australis*. Regarded as Vulnerable in Europe following decades of population decline (BirdLife International 2004), the species is a Red-listed bird of UK conservation concern and a UK BAP Priority Species.

The Bittern has long been known as an inhabitant of the UK. Much superstition, mystery and even fear has surrounded the bird – not least because the low-frequency 'booming' song of the male is such an unusual, eerie sound, not obviously produced by a bird. The Irish writer Oliver Goldsmith remarked that 'those who have walked in an evening by the sedgy sides of unfrequented rivers, must remember the variety of notes from different water-fowl: the loud scream of the wild-goose, the croaking of the mallard, the whining of the lapwing, and the tremulous neighing of the jack-snipe. But of all those sounds, there is none so dismally hollow as the booming of the bittern. It is impossible for words to give those who have not heard this evening call an adequate idea of its solemnity... issuing from some formidable being that resided at the bottom of the waters.' He went on: 'I remember, in the place where I was a boy, with what terror this bird's note affected the whole village; they considered it the presage of some sad event; and generally found or made one to succeed it. I do not speak ludicrously; but if any person in the neighbourhood died, they supposed it could not be otherwise, for the night-raven had foretold it; but if no body happened to die, the death of a cow or a sheep gave completion to the prophecy' (Goldsmith 1851).

Even today, few can claim to have *seen* a Bittern boom so it is understandable that many misconceptions have arisen as to how the sound is produced. Isaac Casaubon, a visitor to Ely in Cambridgeshire in 1611 and quoted in Lack (1934), stated that 'In the Ely country there is a bird about as big as a hen, in colour a mixture of yellow and grey, etc., having very long legs, and called Bliterra. It is said to be in the habit of introducing its bill into one of the nearest reeds, and of thundering forth a voice so horrible that those unused to the thing, say it is that of an evil spirit, and so loud that two gentlemen assured me it could be heard for three or four miles. It is not agreeable meat.' Goldsmith, however, had a remarkably correct understanding, stating that 'its windpipe is fitted to produce the sound for which it is remarkable; the lower part of it dividing into the lungs, is supplied with a thin loose membrane, that can be filled with a large body of air, and exploded at pleasure. These bellowing explosions are chiefly heard from the beginning of spring to the end of autumn; and however awful they may sound to us, are the calls to courtship, or of connubial felicity.'

Once widespread across the lowlands of the UK, the Bittern had many local names – among them bog blutter, buttle, bumbagus, myre-dromble, miredrum, bog-bluiter and butterbump – and these suggest a familiarity to country dwellers in many areas. Evidence of local abundance comes from some of the earliest ornithological literature. For example, Lubbock (1845) wrote that: 'I remember when the birds could be found with certainty in the extensive tracts of reed about Hickling broad and Heigham sounds [in Norfolk]. Four or five might be seen in a morning.' Stevenson (1870) reported that a thatcher at Feltwell in the Norfolk fens had told him that Bitterns were once 'extremely plentiful' in that neighbourhood, selling for the same price as Common Snipe *Gallinago gallinago*. The thatcher told Stevenson that his gamekeeper grandfather had a Bittern roasted for dinner every Sunday and had once shot five birds in one day in the nearby fens. Stevenson (1870) himself reported a tally of 108 Bitterns killed in Norfolk between October and April in the 18 years prior to the writing of his book.

Unfortunately, the literature contains few reports of confirmed breeding and it is often not clear whether the reports of large numbers refer to the breeding or winter season. However, given the difficulty of finding Bittern nests, it would be unwise to



Robin Chittenden

37. A Eurasian Bittern *Botaurus stellaris* in characteristic hunting pose: some modern-day, well-placed hides now regularly permit such encounters; Norfolk, February 2008.

infer from the paucity of confirmed breeding records that Bitterns were only ever numerous in winter. It is, nevertheless, rather difficult to determine the distribution, let alone numbers, of breeding Bitterns in the UK prior to national extinction in about 1886. However, it is evident that Bitterns once bred in all the constituent countries of the UK. In Scotland, it was a fairly common resident breeding species, one of the birds preserved for the sport of hawking and mentioned in several fifteenth- and sixteenth-century texts (Baxter & Rintoul 1953). Testament to its former abundance in Scotland is the comment in Montagu (1831) that 'the sound of the Bittern is so very common that every child is familiar with it, though the birds, from being shy, are not often seen'; although by the time he wrote that passage, the Bittern was breeding regularly in only a very few places in Scotland. In Ireland, the Bittern had also once been regarded as common. Thompson (1850) wrote that: 'once common in Ireland, [the Bittern] is gradually becoming scarce, owing to the drainage of the bogs and marshes.' He added that: 'it therefore seems desirable to me, in a statistical point of view, that such information that I possess on the species should be given in detail.' However, he was able to report only the recollections of others that birds boomed in Northern Ireland 'in the neighbourhood of Dungiven' in Co. Londonderry and in Co. Fermanagh about 1820 and that the birds were common in the Lower Ardes, Co. Down, in about 1744. His other records, all from the winter period, were of a single bird from Co. Armagh, three from Co. Antrim and perhaps 15 or so from Co. Down, including 'about six' obtained some 10–12 years prior to 1833, three from within five miles [8 km] of Belfast (Thompson 1850). It is believed that Bitterns have not bred in Northern Ireland (nor elsewhere in Ireland) since the 1840s (Ussher & Warren 1900; Ruttledge 1966; Allen & Mellon 2010). In Wales, the species was also once widespread but had become restricted to Margam and Crymlyn in Glamorgan, Cors Caron and Cors Fochno in Ceridigion and probably also Anglesey by the middle of the nineteenth century (Lovegrove *et al.* 1994).

There is rather more information concerning the former distribution of Bitterns in England, even though here, as elsewhere, much of the species' wetland habitat had already been drained by the time the early Victorian avifaunas were being compiled and

much had been lost altogether by the late Victorian period. Perhaps understandably, much of the available information is rather vague, concerns purported last records (often of 'boomers' found long after regular breeding ceased in an area), or approximations of when breeding ceased in a county. Nevertheless, it is evident that they once bred from Kent and Somerset in the south, locally northwards to both Cumbria and Northumberland. Their demise from many counties has apparently gone undocumented but in Cheshire nests were known until the early part of the nineteenth century, in Northumberland until about 1820 (at Newham), in Cambridgeshire until 1821, in Shropshire until 1836, in Lincolnshire until about 1850 (birds being still reportedly numerous in the Isle of Axholme in the 1830s), in Warwickshire until about 1865, in Suffolk probably until the 1870s, in Dorset until 1883, in Hampshire until sometime between 1886 and 1889 (in Avington Park, near Winchester) and in Cumbria possibly until as late as 1891 (Holloway 1996; Green 2004; Lorand & Atkin 1989; SOS 1992). The last confirmed breeding records for the UK came from Norfolk, where booming birds were present in the Hoveton/Woodbastwick area in 1866 (where Stevenson described clearly what appears to have been a feeding flight in June of that year) and again in 1867, two eggs were taken from a nest on Upton Broad in 1868, a downy young bird was taken alive on 25th May from the same area in the same year and a downy female was found near Ludham in 1886 (Stevenson 1866–90).

The cause of the species' loss is far from obscure. Many of their reedbed haunts were drained (the process of drainage began in earnest in the seventeenth century) and the land put to agricultural use, while others were left as small fragments in an otherwise hostile landscape. Macpherson (1892), for example, reported that in Lakeland: 'if a stray Bittern lingered among our bogs and flows during the early summers of the present century, the energy of the engineers who converted pools of standing water into valuable corn-fields, soon banished the poor "Miredrum" from the ancient home of its race.' Even where the habitat allowed them to persist, as in Broadland, they were much persecuted by skin collectors, eggers, sportsmen and by those seeking the species' flesh for the table.

Bitterns return, increase in numbers then decline again

Rather against the odds, Bitterns boomed again, reportedly at Cardew Mire in Cumbria in 1891 (Macpherson 1892) and certainly in Broadland in 1900 but it was not until 1911 that evidence of breeding was found when young birds and a vacated nest were discovered at Sutton Broad in Norfolk. Perhaps heeding the warning of Broadland Bittern-protector Emma Turner (1919) that 'it will

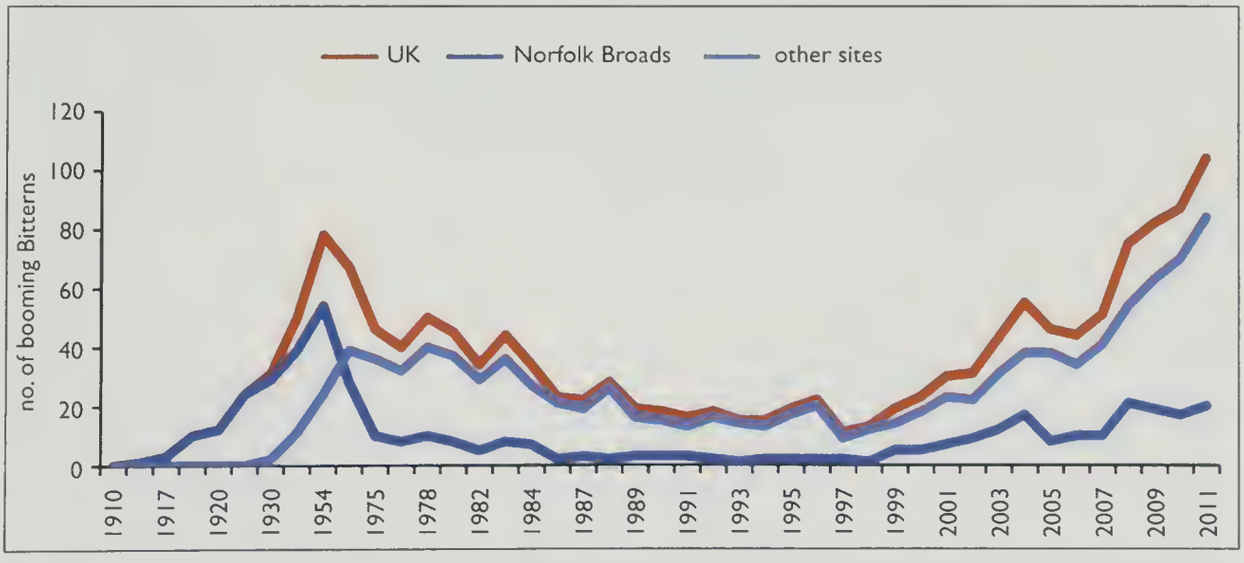


Fig. 1. The numbers of booming male Eurasian Bitterns *Botaurus stellaris* in the UK, 1910–2011. The figures up to 1989 are estimates made irregularly from the available literature. Those from 1990 are derived from standardised annual monitoring. The UK total is split into birds in the Norfolk Broads and those elsewhere. Note non-regular intervals for years to 1987 and annual intervals thereafter.

now be the duty of every ornithologist... to guard this recovered inheritance which our forefathers wasted so shockingly', Bitterns *were* left relatively unmolested, and numbers gradually increased in Broadland, reaching an estimated 16–17 'pairs' by 1923 (Turner 1924, who found 11 nests that year) and some 23–25 'pairs' by 1928 (Riviere 1930).

Breeding was confirmed for the first time away from Broadland, at Thorpeness in Suffolk, in 1929. Within the decade, confirmation also came from Cley in north Norfolk in 1937 and from Burwell Fen in Cambridgeshire in 1938 (but not subsequently in the county until decades later) and by the end of the 1930s, booming birds had been reported from widely spread localities across Britain and Ireland. Booming was first reported in Kent in 1935 or 1938, at Leighton Moss in Lancashire in 1937 and breeding attempts were reported from Ayrshire and Fife (Forrester *et al.* 2007) and Co. Offaly some time before 1940 (Ruttledge 1966). Breeding was first confirmed in Essex in 1944, in Kent in 1947 (Stodmarsh), in Lincolnshire in 1949, in Northumberland in 1956, in Lancashire in 1958 (Leighton Moss) and on Anglesey in 1968 (Llyn Traffwll) (Payn 1962; Day & Wilson 1978; Taylor *et al.* 1981; Lorand & Atkin 1989; Wood 2007). The British population reached a peak of some 79–82 booming males in 1954 (Day & Wilson 1978), this increase having no doubt been facilitated by the flooding of a significant area of low-lying coastal land during World War II and its subsequent abandonment and colonisation by reed.

Despite the increase in both range and numbers, 98% of the birds in 1954 were still to be found in England; even there, though spread over seven counties, 74–75 boomers were found in just two counties – Norfolk and Suffolk – where the great majority were still to be found in Broadland. This important area no doubt controlled proceedings farther afield, producing many young Bitterns that were able to colonise other areas. However, these areas then lost their birds a few years later at the same time as the Broadland population began to decline seriously (fig. 1). The 1970 national survey revealed that numbers of booming birds in Broadland had fallen by 48%, from 54 boomers in 1954 to just 28 in 1970. A national survey in 1976 revealed just 45–47 boomers nationwide (Day & Wilson 1978), with 21–22 in Suffolk, ten in both Norfolk (where just nine were in Broadland) and Lancashire, two in North Wales and one or two in Somerset and Lincolnshire. Birds were lost altogether from the Somerset Levels,



Robin Chittenden

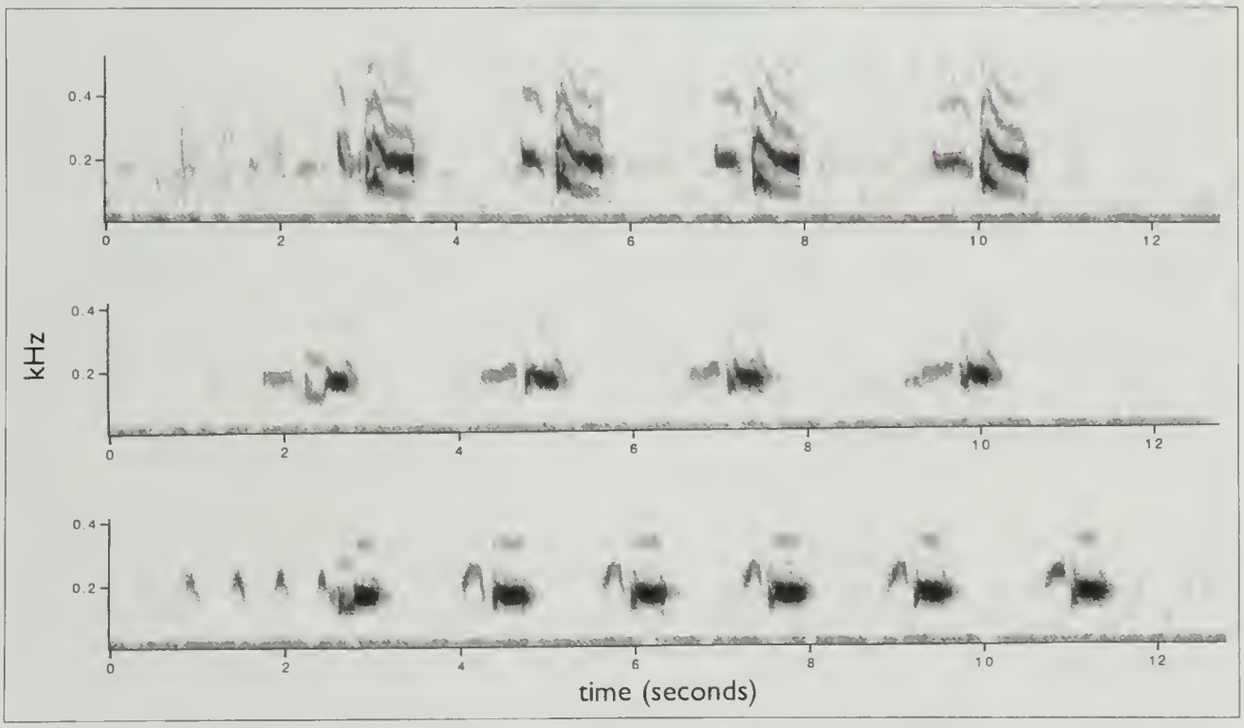
38. Eurasian Bittern *Botaurus stellaris*, Strumpshaw Fen, Norfolk, November 2010.

the Stour Valley of Kent and the Humber Bank between the 1968–72 and the 1988–91 atlases, and by the late 1980s booming birds were virtually confined to Leighton Moss in Lancashire, to the Hickling, Horsey and Martham area of Norfolk's Broadland, to the north Norfolk coast (principally at Cley but irregularly elsewhere), and to the Suffolk coast at Minsmere, Walberswick and at Easton, Covehithe and Benacre Broads.

Outside England, booming Bitterns had by this time become really exceptional finds. For example, 85% of sightings in Scotland since 1950 were made during the autumn and winter months, with about a dozen records of summering birds, including a bird which boomed in the Borders in 1980 (Thom 1986). There is no evidence that any of these birds ever bred in the country (Forrester *et al.* 2007). In Wales, a small population of booming birds built up on Anglesey following colonisation in the late 1960s, with booming birds at five sites on the island in 1966 and up to 11 boomers present annually in the mid 1970s. The favoured sites were the wetlands at Llyn Llywenan, Penrhyn, Dinam, Garreg-lwyd, Tarffwll, Maelog, Bodgylched, Padrig and Coron but breeding was proved only in 1968; numbers fell rapidly during the 1970s and breeding activity had ceased by the mid 1980s. Elsewhere in Wales, booming birds were present on the Gower at Oxwich annually during 1969–74, with two boomers present in spring 1972. A 'pair' was reported there in 1973 and another bird boomed in 1979. There were only 19 or 20 occurrences of Bitterns in Northern Ireland in the twentieth century and most of those were wintering birds, found in every county with the exception of Tyrone. There were, however, three records of birds in the summer months: two birds were at Killough, Co. Down, on 23rd July 1953 and there are two records of booming birds at Lough Erne, Co. Fermanagh, in 1976, though these perhaps involved the same individual (Allen & Mellon 2010).



Guy Shorrock



Gillian Gilbert

39. Understanding Eurasian Bittern *Botaurus stellaris* ecology necessitated the adoption of some new approaches. Sound recordings and sonogram analyses (here of three different individuals at Minsmere, Suffolk, in 1997) demonstrated that booming males each had unique calls and this information has been used to obtain more accurate population estimates.

By the 1980s, it was clearly an urgent matter to determine accurately the number of individuals at the few sites that still retained Bitterns and to work out why other sites had lost them. A national survey in 1990 used a new method that combined techniques of mapping the territories of booming male Bitterns using triangulation and the individual identification of these males by the characteristics of their booming songs. Annual monitoring has taken place since 1990 at a national scale, enabling us to measure change, to prioritise the allocation of resources, to attract funding, set targets and to measure the effectiveness of our actions (the habitat management necessary to rehabilitate reedbeds and to create others from scratch is expensive and it has been essential to measure how the population has reacted to that expenditure). Later research led to a standardised programme of monitoring, not only of vocalising males, but also of nesting females, prey availability, water quality and habitat. This has helped diagnose site-specific problems and allowed us to further target habitat management. The 1990 survey revealed a shockingly low UK population of just 18–20 booming males, all in England. Worse was to come, and by 1997 the population stood at just 11 boomers at seven English sites (Wotton *et al.* 2011).

Throughout that time, Bittern numbers have apparently remained buoyant in winter, with English-bred birds joined by an annual arrival of continental immigrants. Bibby (1981) estimated that 30–100 were probably to be found in Britain in most years, but during the hard winter of 1978/79 a total of 189 were located (Bibby 1981) and, indeed, the severity of winter weather on the continent does seem to determine numbers appearing here (Bibby 1981). Though widespread in winter, most birds were, and continue to be, found in southern and southeastern reedbeds, from Norfolk to Dorset. At this time of year, Bitterns may be found in smaller reedbeds, including those around small lakes, ponds and gravel-pits, along ditches on grazing marshes or in other wetlands at sewage treatment works and watercress beds. Despite the buoyant winter numbers, most if not all immigrants returned to the continent in spring and breeding numbers continued an inexorable decline.



Robin Chittenden

40. Freezing conditions tend to cause Eurasian Bitterns *Botaurus stellaris* to move out of the reedy shallows in order to hunt, and opportunities for observing Bitterns have most often been provided when such conditions prevail; Norfolk, December 2010.

Diagnosing the causes of decline

The extremely worrying results of the annual monitoring programme in the early 1990s were the catalyst to begin a period of intensive research, designed to help diagnose the causes of decline and to identify a means of halting and then reversing it. This is a rare species, almost impossible to observe, inhabiting an unwelcoming habitat that is difficult to access; perhaps unsurprisingly, then, there had been no previous research into its habits in any part of its range. The initial approach in the UK was thus a cautious one.

The first step was to compare the habitat characteristics of 11 reedbeds that had been abandoned by Bitterns over a 12-year period with the same characteristics from 11 that had retained them. Detailed measures, reflecting the successional stage of the habitat (e.g. litter build up, basal vegetation density, water levels and the degree of scrub encroachment), were taken from randomly located quadrats within each site. These measures were then related statistically to the presence or absence of Bitterns, the results giving the first quantitative evidence that seral succession and inappropriate management of our freshwater vegetative communities was limiting Bittern populations (Tyler *et al.* 1998). Habitat degradation – essentially drying – leading to a lack of suitable places for Bitterns to forage and to nest was considered to be of primary importance in driving the loss of Bitterns. Further evidence of the importance of water levels came from an analysis of the between-year survival of individual adult male Bitterns. Local annual survival was positively related to rainfall in winter (January to March), indicating that rainfall, through its effect on water levels, was an important influence on survival or the likelihood of permanent emigration (Gilbert *et al.* 2002).

It was clear that the small number of Bitterns that remained in the UK in the early 1990s occupied the larger, wetter sites that had been managed in some way, sometimes for commercial reed-cutting purposes. Smaller, dry and tidal reedbeds were apparently avoided. By the mid 1990s, it was also evident that most of the UK's reedbeds were, in fact, too small and too dry. Even where a reedbed might be regarded as wet and where it still held breeding Bitterns, it often contained extensive stands of dry reed, unsuited to use by Bitterns. The unpalatable fact is that favoured Bittern habitat tends to be transient, gradually lost as reed litter accumulates and as the reedbeds become drier. Scrub can then encroach and dry the reedbed more rapidly still – so that it eventually becomes first carr, then dry woodland. This process of natural seral succession had clearly been the principal cause of the species' decline since the 1950s.

This initial insight provided a huge leap forward in our knowledge of Bittern ecology at a site scale. But our understanding quickly developed further as more detailed studies of habitat selection, diet and the breeding biology of individual birds were conducted, often using new techniques. The study of the males' booming behaviour and their use of a breeding home range, for example, allowed us to define a measurable area of importance



Andy Brown

41. A party of researchers trying to locate the first Eurasian Bittern *Botaurus stellaris* nest for many decades on the banks of the Humber in 2000. Note the tall stick – an essential aid to mapping nest locations before the advent of affordable GPS!

for individual birds. During the breeding season, the males feed within these home ranges and the selection of habitat within them is driven by the availability of food. The males' more obvious and predictable behaviour makes them easier to catch than females and several individuals were fitted with radio transmitters. Radio-tagging and the time-consuming process of mapping the locations of, and sound recording, individual booming males (see Box 1), gave an important insight into the behaviour of territorial males, especially the finding that they preferred the flooded 30-m margin of vegetation next to open water (Gilbert *et al.* 2005). Triangulation and radio-tracking studies from across Europe revealed a common pattern, with the presence of tall, emergent vegetation and standing water, especially open water, being of prime importance to Bitterns. The relative composition of these elements was found to differ according to the needs of the most readily available prey species. The crucial insight concerned the importance of the

BOX 1

'Bittern pioneers'.

Necessity is the mother of invention and during the campaign to take recovery action for such a difficult species, many problems were encountered that had to be overcome by the development of new techniques. Examples include:

Radio-tracking The process of developing a waterproof radio tag with a safe attachment method was achieved by Glen Tyler and Biotrack Ltd (Wareham, Dorset). This is a difficult process for a new and rare species, requiring a great deal of care and knowledge so that the tag did not affect the behaviour or survival of the birds yet delivered the required data.

Catching adult male Bitterns The field skills, patience, ethics and sheer hard work of Glen Tyler and Ken Smith allowed them to develop a way of safely catching Bitterns. This work paved the way for many others to carry out similar research across Europe.

Vocal individuality A technique of combining information from territory mapping exercises and information from individual spectrograms was used from 1990 to 2004 to assess the numbers of booming male Bitterns and through this technique we learnt much about male behaviour and yearly survival.

Nest finding Gaining an intimate knowledge of the behaviour of the females was crucial in allowing us to find nests. Microwave transmitters then allowed us to film nests to check the effect of our visits to ensure that nests were visited safely.

Fish sampling Standard fish-sampling methods were extremely difficult to employ inside a reedbed or wet reed edge. Richard Noble and Iain Cowx from Hull International Fisheries Institute developed an electrofishing 'spider' that allowed fish to be sampled within dense vegetation.

Elver monitoring The European Eel is a very important prey item of UK Bitterns. David Mower and Matt Self developed and implemented methods of monitoring the numbers of this important and declining species in key reedbed sites.

Bed lowering Geoff Welch and Ian Hawkins at Minsmere and Rick Southwood in the Bure Marshes were among the first brave site managers who had to find ways to use large excavators and machinery not designed for working in swamps, to lower, reform and create wetlands that work for Bitterns. Some plant was lost during the learning curve and at least one crew were extracted from the mire by an air-sea rescue helicopter.

Battering and re-profiling dykes The process of crafting ditches to a depth and profile attractive to reed, fish and Bitterns was adopted with relish by some contractors (notably by Kocurek Excavators Ltd and Fen Ditching Company Ltd), some even developing their own bespoke tools for the process.

Growing and planting reeds Site managers became experts at planting their own reeds and growing them from seed in polytunnels to cut down on costs. Norman Sills mastered the technique and has grown the millions of seedlings used to populate wet ground at Lakenheath.

Large-scale creation activity Paul Burnham at Stodmarsh, Norman Sills at Lakenheath and Sally Mills at Ham Wall were among the earliest to attempt some really large-scale landformings, creating a muddy, hideous, if temporary mess in full public gaze in the process yet having faith and strength of character to see their projects through to successful completion.

structure of the interface between wet reedbed and open water, which needs to allow the fish prey species on which Bitterns depend to become available without requiring the birds to break cover.

A more complete picture of the habitat required by Bitterns was gained once we began to study the females, not least because it is they alone that build the nest and care for the young: the male takes no part in nesting activity, the care of the young or, indeed, of the female. Nest finding (see Box 1) was crucial not only to understanding female-specific habitat choice, but also to understanding which factors influenced productivity, diet, first-year dispersal and survival. Again, the importance of water within the reedbed was found to be an important aspect of female nesting habitat, with females selecting the more undisturbed areas of reed with thicker, stronger vegetation in areas where surface water was likely to remain at some suitable depth through the season (Gilbert *et al.* 2005). Of crucial importance is the availability to the females of an area of open water supporting a healthy fish population of an appropriate species, but it was only by sampling the diet of chicks that we discovered what the suitable fish species might be (at least within the limits of the species available to Bitterns in the UK; Gilbert *et al.* 2003). Bittern diet varies widely across countries, but is almost always dominated by fish. The fish species taken are invariably those which at some stage in their life penetrate into the littoral wet margins. Species vary in local abundance and availability but those favoured in the UK are Rudd *Scardinius erythrophthalmus* and European Eels *Anguilla anguilla*. Other taxa which are occasionally important in the diet are amphibians, crayfish, mammals and aquatic invertebrates.

Research efforts next focused on obtaining a greater understanding of how to provide the necessary food for Bitterns and on how to make that food available to them. Two quantitative studies explored the relative importance of predation and starvation as causes of chick mortality (Puglisi & Bretagnolle 2005; Gilbert *et al.* 2007), and in the UK starvation was found to be the single most important factor in limiting population recovery and expansion. Bittern populations have the potential to increase or recover quickly, as we know that females and males can breed successfully in their first year (Gilbert *et al.* 2007), males are polygynous (Cramp & Simmons 1977) and females have been proved to produce two broods of young in one season (Mallord *et al.* 2000). However, and unusually among herons in general, the female takes sole care of raising the young (Cramp & Simmons 1977) and the balance for the female of being away from the nest to find food, brooding the young against exposure and protection against predators is a delicate one. If food is hard to find, the females will be away from the nest for longer, leaving chicks more vulnerable to exposure and predation. Research to understand how fish populations behave in reedbeds was crucial in helping identify reedbed designs that would promote year-round access for a healthy fish



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42. Not all reedbeds are used by Eurasian Bitterns *Botaurus stellaris*. The tidal reedbeds between Brancaster and Titchwell, in Norfolk, are dry and fishless for most of the year but are deeply flooded by sea water at others, such as when this photograph was taken in August 1997.



Robin Chittenden

43. Eurasian Bitterns *Botaurus stellaris* have a varied diet; though dominated by fish, it can also include crayfish, small mammals, aquatic invertebrates and, as on this occasion, amphibians.

population – and access to the fish by Bitterns. Our ability to manipulate fish populations in this way has proved to be especially important in determining the presence and success of nesting females in new or failing sites (Noble *et al.* 2004; Self 2005; see also Box 2).

Emergency action to recover Bittern numbers – reedbed restoration and creation

There was rapid agreement in the conservation community in the early 1990s that the highest priority should be attached to conservation action for Bitterns. This was given a high public profile on the publication of the UK Government's Biodiversity Action Plan in 1994, which contained specific plans for the recovery of both Bitterns and reedbeds. The ambitious target was to halt and then reverse the decline of Bitterns by creating suitable habitat for 100 'boomers' by 2020. It was estimated that the restoration of existing reedbeds could provide habitat for 30–40 boomers, so new reedbeds, suitable for hosting a further 60 boomers, would be required. Since Bitterns prefer larger reedbeds (rarely being found in those of <20 ha in the mid 1990s), some 1,200 ha of new reed in blocks no smaller than 20 ha was required (UKBAP 1995). This challenging and daunting requirement was justified on the basis that, even in favourable conditions, natural reedbed expansion is too slow, whereas new reedbeds can readily be established in 2–5 years (RSPB 1994).

Emergency action to halt the decline began immediately, although the first projects were rather modest in scale. English Nature (now Natural England) commenced its Bittern Recovery Project in 1994 with an annual budget of £60,000. The immediate focus was on the restoration of larger reedbeds already in conservation ownership. The project contributed to reedbed restoration projects, for example at Minsmere (RSPB) in Suffolk and at Far Ings (Lincolnshire Wildlife Trust) in Lincolnshire, with the available monies often being matched by the recipients – whether statutory or voluntary sector. The finances also helped to restore privately held reedbeds, as in parts of the Bure Marshes NNR in the Norfolk Broads, and extend some smaller reedbeds, as at Holme (Norfolk Wildlife Trust) and Burnham Overy (part of Holkham Estate, managed by Natural England) in north Norfolk. Boxes 1 and 3 provide more information on some of the pioneering techniques employed during this phase of the work and on key elements of reedbed restoration and construction (see also plate 44).

Action was based on the research evidence

What we think Bitterns need.

BOX 2

1. Larger wetlands
- Large sites (>20 ha), with wet reedbed and particularly those with wet and graduated edges, plenty of variation in edge structure and a good gradation from wet reedbed to macrophyte-rich water.
- Large sites provide newly fledged and first-winter Bitterns with more options than smaller sites. These birds tend to disperse from their natal site, so a surrounding network of wetland feeding and safe roosting opportunities provides them with the best chance of surviving a difficult first winter.

2. A wet reedbed
- A significant proportion (minimum 20–30%) of the site should consist of open-water pools or meres with sufficient structure, connectivity, macrophyte assemblage and water quality to support a sustainable fish population in summer as well as in winter, when deeper water refuges are essential.
- The water level across the reedbed should be at least 20 cm deep and should not fluctuate widely. Recent evidence shows that Bitterns can cope well with water 50 cm deep or more. Some reed areas should be free from disturbance to allow nesting, but remain wet for a sufficient period to allow chicks to fledge. Some profiled open-water reedbed edges should remain wet to allow birds access to food even on sites where the water may be drawn down towards the end of the summer to allow for management or cutting.
- A wet reedbed is more likely to deter most native UK mammalian predators than a dry reedbed. This will not apply to American Mink, however, and their numbers should be monitored and individuals controlled.

3. Fish
- The fish population should contain species whose behaviour determines that they will use wet reedbed margins (notably Rudd and Eel) and there should be sufficient recruitment into the fish population to allow the smaller age classes to be available.

4. Other Bitterns

almost as it was being generated, and so while the process of action and recovery may not always have been 'textbook', it was always based on the best and most recent scientific information available. One major benefit of the 'fast track' between science and restoration action was that those most closely involved in working on the birds had the rather scary luxury of not only seeing their results published in the scientific literature, but also of it being put into action on the ground as it was hot off the press, with their direct involvement occasionally required in drawing up plans for new site designs, restoration works and occasionally in directing the excavator drivers who were doing the work. There was also a healthy relationship between those advising on and determining strategic spending priorities, researchers and those tasked both to advise on management techniques (e.g. Hawke & Jose 1996) and to carry out the restoration works (Smith *et al.*



Andy Brown

44. Reedbed restoration and creation required some lateral thinking and the adoption of some new techniques. Here an excavator bucket, specially modified to create shallow-sided dykes, is in action during the creation of what is now called Stiffkey Fen, Norfolk, in February 1996.

BOX 3

Key elements of reedbed management, restoration and construction.

Ongoing management – usually annual – to influence succession.

Removing vegetation by cutting, burning or grazing (grazing also can provide structure).

Manipulating water levels, using sluices and other water control structures and by using periodic drying or flooding to hold back succession.

Manipulating the fish population and the access of Bitterns to it.

Mink control.

Monitoring Bittern numbers and productivity, predators present, periodic site audits.

Restoration – one-off larger-scale works.

Changing water control methods, raising water levels or flooding existing low-lying land.

Bed lowering, removing accumulated reed litter and other parts of the substrate.

Enhancing or increasing open water and ditch features.

Creation of new reedbed sites or extensions.

Using known quantitative proportions of what we think Bitterns need, while considering other priority species.

Variability, complex edges, connectivity and gradients are key structural landforming features.

Reed establishment may require growing plugs and planting or putting in rhizomes from elsewhere.

2000). This open dialogue between the various parties was crucial to the development and success of the work. Initially, practical restoration reflected the early scientific results, which showed the importance of larger, wetter reedbeds and of wet feeding edges. In subsequent years, site design and management embraced the emerging scientific findings on Bittern diet, nesting habitat, chick survival and dispersal.

A close and effective working relationship between the statutory and voluntary sectors allowed the programme to escalate quickly. Two consortium bids (led by RSPB and Natural England, but with multi-partnership involvement) to secure major European EU Life-Nature funds provided the financial basis for the necessary multi-site, large-scale work that would really make a difference. The first project funded by EU Life-Nature (from 1996 to 2000) ensured that 'emergency action' was taken to restore at least 350 ha of reedbed spread across 13 sites. Most of these were in the core Suffolk/Norfolk breeding area and the number of booming male Bitterns on these sites has since increased from four in 1997 to 31 in 2011. The second project funded by EU Life-Nature (from 2002 to 2006) created more than 300 ha of new reedbed, restored a further 350 ha and restored and created nearly 40 km of ditches on 19 sites. Most of these sites were purposefully away from the core Suffolk/Norfolk breeding areas in order to encourage Bitterns to reoccupy their former range as part of an attempt to give the species a sustainable long-term future in the UK. Since this project began, the number of booming male Bitterns has increased on the relevant sites from 11 in 2002 to 39 in 2011. Much of that increase has so far happened at a small number of the 19 sites that took part in the project, most notably at Ham Wall (RSPB) in Somerset and at Lakenheath (RSPB) in inland Suffolk. Both these sites are large, newly created reedbeds, which have gone from supporting no Bitterns to having 12 and seven booming males respectively in 2011 (Box 4 and plates 45–47).

Restoration and creation works to improve Bittern habitat have taken place at many UK wetlands since 1994, but the scale of habitat manipulation and the groundworks involved has varied considerably among the sites. Some of the most impressive examples have involved sites that might once

have been put back to agricultural use following mineral extraction. Among the largest of such sites is Ouse Fen, in the Cambridgeshire Fens, where RSPB and Tarmac Ltd will eventually complete the creation of a 700-ha wetland. Significant habitat improvements for Bitterns may involve much less obviously impressive feats than the large-scale creation and restoration of reedbed and open waterbodies, however. Just as crucial are the more subtle projects to engineer better water-level controls, restore water quality, manipulate fish populations, or control non-native predators. To date, significant works have taken place at more than 80 reedbeds throughout the UK. Fig. 2 shows the gradual cumulative increase in the area of reedbed restored and created in the UK since 1994 relative to the numbers of booming male Bitterns. Fig. 3 shows the cumulative increase in the numbers of sites carrying out all types of habitat improvement works for Bitterns (one-off improvements, rather than annual reed-cutting management) relative to the numbers of nesting female Bitterns. Box 4 gives more detail of some of the more



Andy Hay (rspb-images.com)



Andy Brown



Norman Sills (rspb-images.com)

45–47. A series of Fenland carrot fields near Lakenheath (plate 45, in 1995) were subject to extensive groundworks, re-wetting and reed planting during the late 1990s (plate 46, in 1996) to create a superb wetland home for Eurasian Bitterns *Botaurus stellaris* and much other wildlife (plate 47, in 2005). This and similar works elsewhere have been successful in encouraging Bitterns to increase in numbers and, importantly, to move inland into parts of their former range which are safe from saline inundation.

Examples of significant reedbed restoration and creation projects in the UK, 1994–2010.

BOX 4

This is not an exhaustive list, but the sites included are representative of the larger restoration and/or creation schemes from different parts of the UK and with different ownerships. Bittern numbers are the minimum numbers of booming males and minimum numbers of nests, as counted by annual monitoring, with maximum figures in parentheses. We have listed only the owners/managers of the sites and not all the partners involved in funding the works undertaken. Significant Natural England, Heritage Lottery Fund or EU Life-Nature funding will have made most of these works possible.

Site name	County	Approx. current wetland area (ha)	Bittern boomers and nests in 1997	Bittern boomers and nests in 2011	Major works undertaken since 1994	Approx. years since major works started	Owners/ managers	Notes
Bure Broads & Marshes SSSI	Norfolk	740	0 0	3 1	Bed lowering, scrub removal, mud pumping, ditch and open-water creation	16	Private, Natural England and Norfolk Wildlife Trust	
Castle Water at Rye Harbour LNR	East Sussex	46	0 0	1 0	Bed lowering, ditch, island and pool creation	8	Sussex Wildlife Trust	First booming in 2009
Far Ings	Lincolnshire	61	0 0	2 0	Bed lowering, bunding, water-level control, ditch and open-water creation and reforming. Further creation of 5 new pits (10 ha) and acquisition of 4 existing pits formerly used for recreation.	16	Lincolnshire Wildlife Trust	Peak of 3 boomers between 1997 and 2010. Nesting in 2000 for first time in 21 years here.
Ham Wall	Somerset	225	0 0	12 (14) 8 (9)	Complete wetland site creation from peat workings	17	RSPB	First confirmed nesting in 2008
Hen Reedbeds	Suffolk	55	0 0	2 2 (3)	Bed lowering, pool and ditch creation, water-level control; complete reedbed creation from agricultural land	15	Suffolk Wildlife Trust	
Hickling Broad	Norfolk	560	0 0	4 (5) 3 (4)	Bed lowering, pool and ditch creation, water-level control; complete reedbed creation from agricultural land	16	Norfolk Wildlife Trust	Boomers and nesting females recolonised in 1999

Examples of significant reedbed restoration and creation projects in the UK, 1994–2010 *cont.*

BOX 4

Site name	County	Approx. current wetland area (ha)	Bittern boomers and nests in 1997	Bittern boomers and nests in 2011	Major works undertaken since 1994	Approx. years since major works started	Owners/ managers	Notes
Kingfishers Bridge	Cambridgeshire	67	0	1 0	Complete wetland site creation from agricultural land	17	Private (Green family), KFB Wetland Trust (leaseholder), Andrew Green and Roger Beecroft (managers)	Booming first reported in 2003, reached a peak of 4 in 2008. There were 4 confirmed nesting attempts in 2007.
Lakenheath Fen	Suffolk (Fens)	230	0	7 (9) 7 (8)	187 ha of wetland created from agricultural land	15	RSPB	First confirmed booming in 2006 and first confirmed nesting in 2009
Leighton Moss	Lancashire	134 (of which 20 ha is willow scrub)	3 1	1 0	Ecosystem restoration involving silt removal, bed lowering, pool and ditch creation	6	RSPB	Regularly 2 confirmed nests between 2000 and 2008
Leighton Moss – Barrowscout and Silverdale Moss	Lancashire	58	0 0	0 0	Complete wetland/reedfen site creation from agricultural land	9	RSPB	
Malltraeth	Anglesey	273	0 0	0 0	Wetland site creation from agricultural land, with only a small original reedbed and lake	17	RSPB	
Middleton Lakes	Warwickshire/ Staffordshire	160	0 0	0 0	Complete wetland site creation from mineral workings	3	RSPB, Hanson Aggregates and Staffordshire County Council	

Examples of significant reedbed restoration and creation projects in the UK, 1994–2010 *cont.*

BOX 4

Site name	County	Approx. current wetland area (ha)	Bittern boomers and nests in 1997	Bittern boomers and nests in 2011	Major works undertaken since 1994	Approx. years since major works started	Owners/ managers	Notes
Minsmere	Suffolk	335	2 5	11 (14) 6	Bed lowering, pool and ditch creation, water-level control	17	RSPB	Peak of 11 boomers in 2008 and 12 nests in 1999
North Warren	Suffolk	133	0 0	1 1	Bed lowering, pool and ditch creation, water-level control	15	RSPB	Peak of 3 boomers (2007–09) and 3 nests (2006)
Otmoor	Oxfordshire	394	0 0	0 0	Water-level control, pool and ditch creation: complete wetland creation from agricultural land	14	RSPB/private	
Ouse Fen (Hanson-RSPB wetland project)	Cambridgeshire	60	0 0	0 1 (NB nearby boomers at Fen Drayton)	Complete wetland site creation from mineral workings	9	Hanson RSPB	
Radipole Lake	Dorset	83	0 0	0 0	NE-funded restoration undertaken across c. 50% of the site, over two years, involving the creation or restoration of c. 6 km of ditches and over 1.5 ha of open water (made up of 8 different waterbodies)	3	Weymouth & Portland BC (owners), RSPB (manager)	
Shapwick Heath (east and west, including Meare Heath)	Somerset	495	0 0	9 8 (11)	Complete wetland site creation from peat workings	17	Natural England	

Examples of significant reedbed restoration and creation projects in the UK, 1994–2010 *cont.*

BOX 4

Site name	County	Approx. current wetland area (ha)	Bittern boomers and nests in 1997	Bittern boomers and nests in 2011	Major works undertaken since 1994	Approx. years since major works started	Owners/ managers	Notes
Stodmarsh NNR	Kent	249	0 0	1 2 (3)	Bed lowering, ditch restoration and profiling, pool creation, water-level control; complete wetland creation from agricultural land	17	Natural England	Until 2011, no confirmed nesting since the 1970s
Sutton Fen	Norfolk	176	0 0	2 (3) 1	Scrub removal, ditch and open-water restoration and re-profiling	15	RSPB	Peak of 4 boomers in 2008. Occasional nesting attempts (4 out of last 14 years)
Titchwell	Norfolk	(19.5 ha of reedbed)	0 0	1 2	Protection against salt-water flooding, ditch restoration and profiling, pool and ditch creation, raised water levels, reedbed creation	16	RSPB	
Walberswick	Suffolk	398	2 3	5 (6) 2	Bed lowering, pool and ditch creation, raised water levels	16	Natural England	Tidal surges in 2006 and 2007 resulted in saline inundation of much of the site. Between 1997 and 2010, booming has peaked at 8 and nests at 5.
Wigan Flashes	Greater Manchester	150	0 0	0 (1) 0	Bed lowering, pool and ditch creation, water-level control	11	Wigan Council, Lancashire Wildlife Trust	

significant and influential restoration and creation projects.

Not all the work at reedbed restoration sites was aimed at attracting breeding Bitterns; some of the reedbeds were small, but could provide a lifeline as wintering habitat for dispersing UK breeding birds or visiting continental birds. The geographic location of improved sites is very important and whenever a choice of restoration location was available, consideration from an early stage was given to extending the range of the population, in order to create more than one core area of productivity. This was an especially important consideration as the productive UK populations were by 1997 almost all along the East Anglian coastline where many sites are highly vulnerable to inundation by sea water during storms (which climate-change models predict will increase in severity and frequency as our climate changes; Gilbert *et al.* 2010). The second EU Life-Nature-funded project was the first and largest project of its kind in the UK aimed at safeguarding a species' habitat in the face of imminent changes due to climate change.

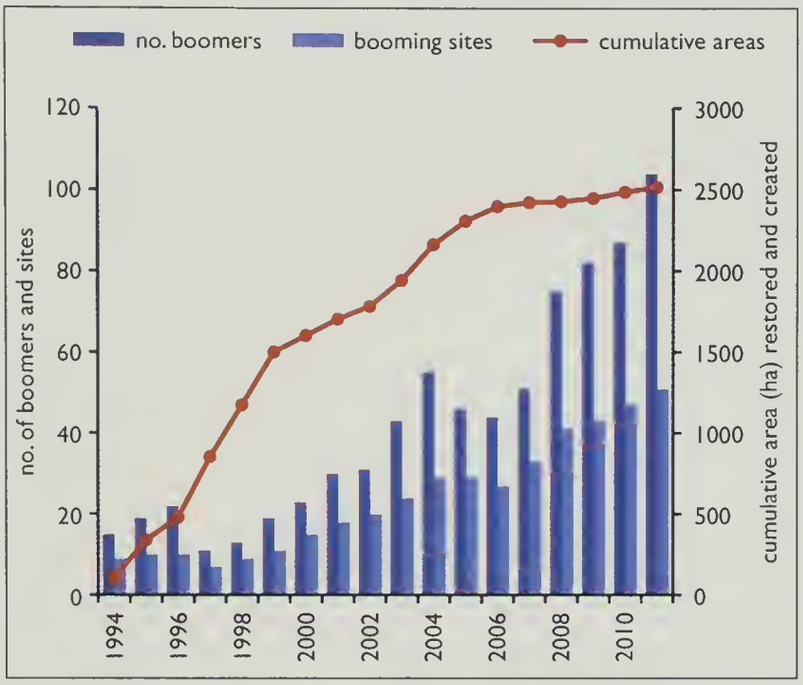


Fig. 2. The numbers of booming male Eurasian Bitterns *Botaurus stellaris* and occupied sites in the UK since 1994 in relation to the estimated cumulative area (in ha) of restored and newly created reedbed combined.

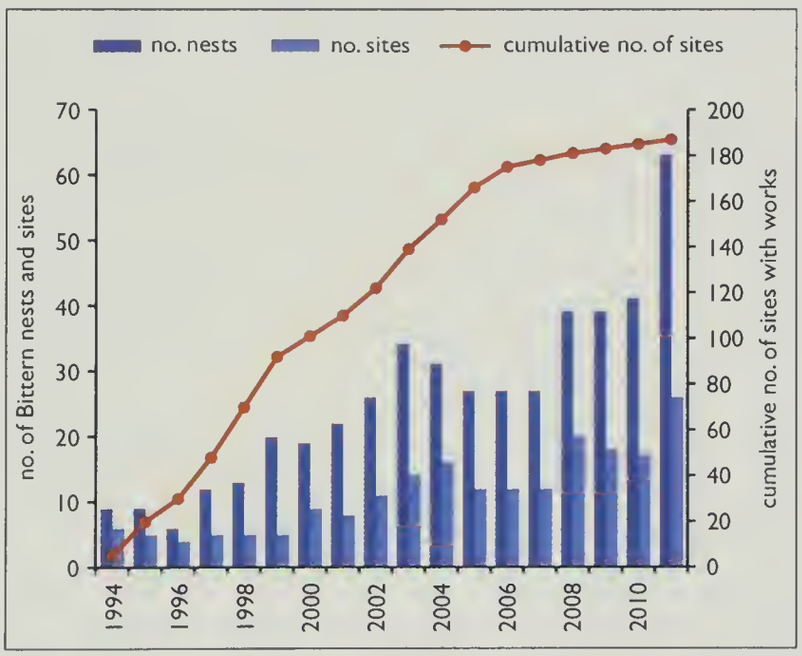


Fig. 3. The number of active Eurasian Bittern *Botaurus stellaris* nests and occupied sites since 1994 relative to the cumulative number of sites at which significant one-off habitat improvement works had taken place. Because significant work was undertaken over several years on some sites, the total number of sites at which work was undertaken in any one year is not meaningful. The actual total number of sites involved was 86.

The response of Bitterns

The response by Bitterns (fig. 4) to conservation action has been both rapid and spectacular and is an excellent example of what can be achieved with highly targeted action. The minimum number of booming males increased year on year from the 1997 nadir to 2004. There were fears that the increase had stalled in 2005 but numbers increased again from 2007, and by 2011 the total population reached 104 boomers – almost certainly the highest number recorded since recolonisation in the early years of the twentieth century (Wotton *et al.* 2011). The number of sites occupied has increased during this period from a low of seven in 1997 to 51 in 2011 while the number of known nests has increased from just six in 1996 to 63 in 2011.

The pattern of increase is fascinating. At first, numbers increased at existing sites which had been restored, almost certainly because birds at these sites became more productive. At Minsmere (RSPB) and Walberswick (managed by Natural England) in Suffolk and Hickling (Norfolk Wildlife Trust) in Norfolk, boomers increased from two, two and none in 1997 to 11, five and four respectively in 2011. However, Bitterns soon began to return to long-abandoned sites that had been restored. North Warren (RSPB) and Hen Reedbeds (Suffolk Wildlife Trust) in Suffolk, for example, were both totally transformed by major excavation works from 1996, and were recolonised by Bitterns in 2000 and 2001 respectively. From 1998 signs of success were seen farther away from the core Norfolk and Suffolk sites. Along the Humber, the major works at Far Ings (Lincolnshire Wildlife Trust) bore fruit as booming birds returned to this area in 1998 and they have nested regularly along the Humber shore since 2000. A few sites had been colonised by boomers in both southeast (Stodmarsh, in Kent) and southwest England (two sites in Somerset and one in Devon) by 1998. Nesting has been regular in the southwest since 2008, and in the southeast there was one nest in 2010 and four in 2011. Fenland (Cambridgeshire and the western edges of Norfolk and Suffolk) saw the return of booming birds in 2002 and birds have nested in this area annually since 2007. Most recently, Bitterns have begun to breed in brand-new sites created specifically for them, such as Kingfishers Bridge (privately owned) in Cambridgeshire (booming since 2003, nesting since 2007), Ham Wall (RSPB) in Somerset (booming since 2003, nesting since 2008 and Lakenheath (RSPB) in Suffolk (booming since 2006 and nesting since 2009).

All of the boomers between 1990 and 2003 were in England. The first to be found in Wales was at Malltraeth in 2004 but booming has only occasionally been reported in Wales and successful breeding has yet to take place there. There were also reports of birds booming for very brief periods at two sites in Scotland and also at one site in Ireland (in Co. Wexford) in 2011. These records hold out the promise that the species may soon return to these countries and to Northern Ireland.

Overall, however, there has been a very significant increase in the species' UK range, with nesting having taken place in nine English counties in the last three years alone. In 2011, 63 Bittern nests were identified at a total of 26 sites in eight counties. Just as Broadland held the core breeding population and fuelled population recovery until the 1950s, so productive Bitterns from the Suffolk coast fuelled recovery since the late 1990s. Although the Broadland population has not yet regained the strength and stability that it once had (fig. 1), this area and the nearby Norfolk and Suffolk coastal reedbeds held 48 of the UK's 104 boomers (46%) and 25 of the 63 nests (40%) located in the UK in 2011. This is rather worrying, however, as many of these sites are highly vulnerable to salt-water incursion and tidal inundation. Not all are immediately vulnerable, but equally, coastal areas elsewhere in eastern and southern England (such as the

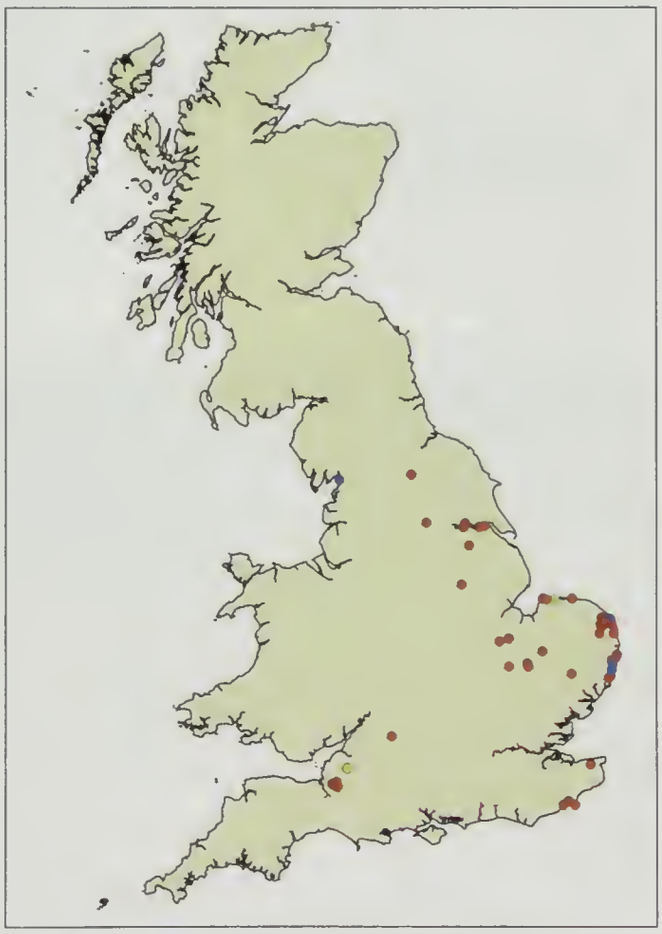


Fig. 4. The distribution of sites occupied by booming male Eurasian Bitterns *Botaurus stellaris* in the UK in 1997 and 2011. Yellow sites were occupied in 1997 only, red in 2011 only, blue in both years. Seven sites were occupied by 11 Bitterns in 1997, 51 sites by 104 Bitterns in 2011.



Philip Amies



Philip Amies



Philip Amies

48–50. Eurasian Bitterns *Botaurus stellaris* can swim. Here, a near-fledged bird traverses open water at Thornham, Norfolk, in June 2011, passing a party of Gadwalls *Anas strepera* and a female Common Pochard *Aythya ferina* with two ducklings (plate 48). But such adventures are not without risk and, as this series of photographs shows, the female Pochard was clearly unimpressed by the proximity of this potential predator and eventually gave chase, with the Bittern turning tail and crashing back into the reeds from which it had just emerged.

Humber Bank) are, so we have reason to be concerned for the long-term future of the reedbeds currently used by about half the UK Bittern population.

Every year continental Bitterns winter in UK wetlands and almost certainly it was such birds that recolonised England in 1911. By contrast, population models of the recent recovery show a strong link between the numbers of UK young fledged and population growth, so it seems likely that the recent Bittern recovery has been – and continues to be – largely dependent on the success of recruitment from within the UK population, rather than on occasional incidents of wintering birds deciding to stay to breed. Some 86% of the 51 sites occupied by booming male Bitterns in 2011 have received at least some Bittern-focused restorative work to enhance the existing wetland habitat. There is strong correlative evidence (but not causal, or experimental) that the recent habitat improvements have been responsible for the recovery in the size of the UK Bittern population. We know that much of the habitat used now simply did not exist previously, or that food was not available even where apparently suitable habitat did exist. We should acknowledge, however, that a number of sites where significant work has been carried out have not yet achieved their goals in terms of numbers of Bitterns. Assuming that the habitat improvements have been carried out correctly, the main reasons for a lack of success are likely to include the following: distance from a source of colonisation (isolated and smaller sites far from other sources of dispersing young UK Bitterns are likely to rely on overwinter survival of their own young, possibly off site and returning to breed); a lack of food (the fish population is not quite large enough or contains the less-preferred species); or predation (there may be more of an influence of Mink *Mustela vison* than expected, which can be very difficult to assess without monitoring). Moreover, some sites have unusual problems, which have become apparent only after work has been carried out – mostly involving water quality, water quantity and the effects of invasive species, all of which can be very difficult to solve.

Notwithstanding the fact that our winter-visiting Bitterns tend to return to their natal areas abroad, UK reedbeds are becoming increasingly important for Bitterns in winter, with higher numbers recorded at a number of sites across the UK, including many which do not currently support booming males in the breeding season. During the 2009/10 winter, Wotton *et al.* (2011) estimated that there were a minimum of 598 Bitterns wintering in the UK, of which an estimated 208 (35%) were resident birds, with the remainder from continental Europe. While it is not possible to say for certain that there has been a real increase in the numbers of wintering Bitterns in the UK in recent years, numbers of breeding birds both in the UK and elsewhere in northern Europe are increasing (BirdLife International 2004).

Keeping on track

Although we now have an idea of what type of wetlands are preferred by the UK's Bitterns, we must always bear in mind that our best evidence comes from research



Andy Brown

51. An early sign of success as a brood of Eurasian Bitterns *Botaurus stellaris* is taken in hand for ringing and for the attachment of radio transmitters; Minsmere, Suffolk, August 1998.



Philip Amies

52. Two near-fledged Eurasian Bittern *Botaurus stellaris* chicks stand at the reed edge at Thornham, Norfolk, in June 2011.



Philip Amies

53. Four near-fledged Eurasian Bittern *Botaurus stellaris* chicks in a rushy field at Thornham, Norfolk, in June 2011, waiting for the arrival of their mother with food.



Philip Amies

54. Two barely concealed Eurasian Bittern *Botaurus stellaris* fledglings in a pathside reedbed at Thornham in Norfolk, June 2011.

conducted on a population on the brink of extinction, occupying the most altered of freshwater wetlands on the western edge of an almost global range. We also need to acknowledge that our evidence, although invaluable, is almost ten years old. We should thus remain receptive to all the waves of new information that come across our bows, both from within the UK as our population expands and from other countries as new and exciting research is completed. We are aware of particular needs in respect of water levels, both the levels that Bitterns can do well in and the seasonal levels that are healthy for a wetland system. Even if we do not conduct another full-scale research programme on Bitterns in the UK, we should review new information regularly and update our advice and action on the ground accordingly.

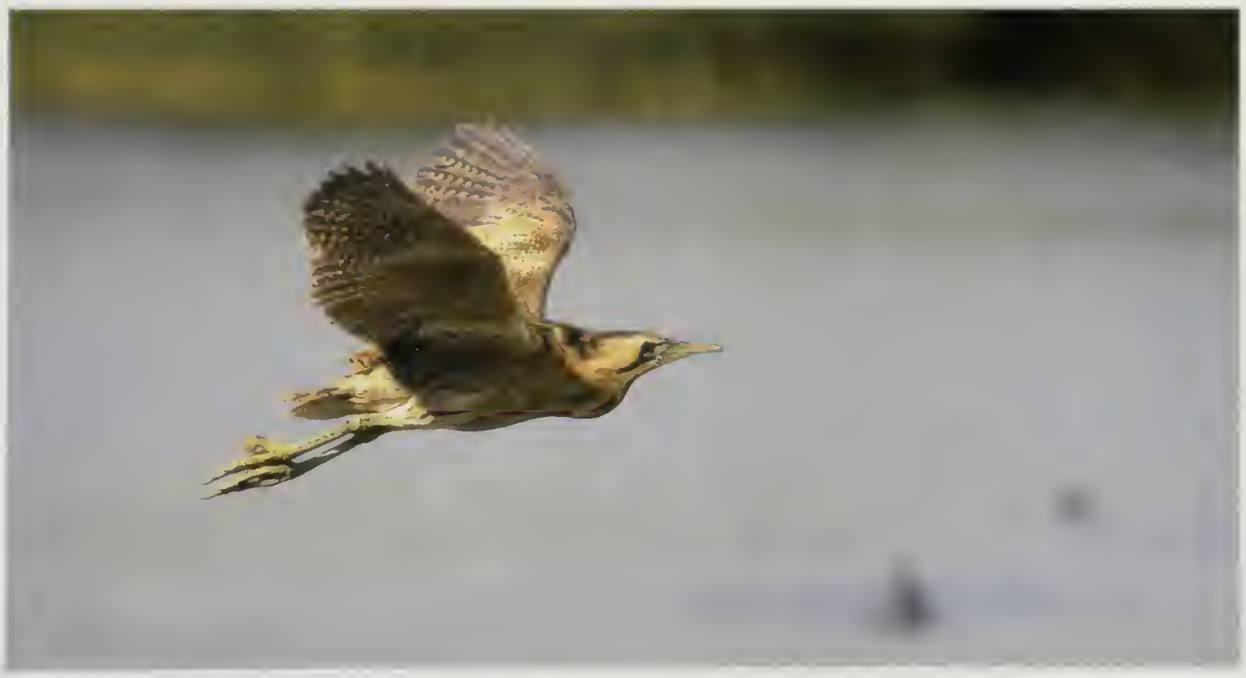
Reedbed wetlands are dynamic ecosystems; like many others, they are constantly changing. Almost as soon as major works have been completed, a regime of near-annual management is required to maintain the desired conditions, notably those typical of an early successional reedbed. This can be a difficult proposition in the more inaccessible parts of our larger reedbeds and at sites where site managers seek to provide for the complex habitat requirements of a broader suite of key species (avian and non-avian) with slightly different requirements.

One way of monitoring conditions at the key sites is to conduct formal reedbed 'audits'. These are periodic stocktakes, which use a standard assessment of habitat condition between years and between sites. Each

reedbed is unique and, therefore, regardless of overall national targets, has its own constraints, so specific visits that access the heart of the habitat and collect data that is measureable both between sites and within the site over time is crucial. Each audit commences with a general overview of the site – its area and conservation objectives, its water quantity, quality and control, the general state of the reed, the area cut, the length of rotations involved and the details of any major works conducted within the last decade. Attention is also given to fish and Bittern stocks, particularly to their productivity. Any issues such as drying, scrub encroachment, invasive plants or the security of funding for management are identified. A specific assessment is made of reed age, structure, height, stem density, litter depth, presence of aquatic macrophytes and other plant species, of water levels, open-water depths and edge complexity at a number of sampling sites within the reedbed. The scope of each audit also takes into account an assessment of the fish population and of any potential predators present – this latter notably requiring some long-term monitoring of Mink presence. The attributes are scored and these compared against target scores to determine the overall state of the reedbed. The information obtained during these visits is used by the statutory conservation agencies in formal site condition assessment, by researchers and reserves managers to identify broad trends across the nation's reedbeds and to aid identification of local issues, which can then be addressed by targeted interventions on appropriate sites. The RSPB operates a system of site auditing for its own sites but it also runs courses to train others in how best to make the most of this process and many key reedbeds have now been audited in this way.

Reedbed use by other wildlife: the wider biodiversity benefits of action for Bitterns

As a highly specialised habitat, reedbeds support a rather limited flora and fauna. Among this habitat's characteristic species, however, are a number which are reedbed specialists, range-restricted, declining, nationally scarce or rare and many are also UK BAP Priority Species (Box 5). Until very recently, most – if not all – of the information that we have on how the creation, restoration and management of reedbeds for Bitterns has benefited these and other taxa is anecdotal or highly site-specific. Nevertheless, and especially where reedbed specialists or UK BAP Priority Species are known to be present on a site, their needs have always been considered as part of the process for planning and undertaking significant management works. It has also been the case (certainly with multi-partner projects) that although most of the money for major works has been secured with the Bittern as the



Graham Catley

55. Eurasian Bittern *Botaurus stellaris* in flight, north Lincolnshire, August 2006.

Some other reedbed inhabitants likely to be affected by management for Bitterns. BAP Priority Species are coloured red.

BOX 5

Information and evidence from the RSPB/NE Bringing Reedbeds to Life project (Chloe Hardiman *in litt.*).

Species group	Possible effects of reedbed restoration and creation on other wildlife
Mammals	Otter *Lutra lutra*, Water Vole *Arvicola terrestris*, Water Shrew *Neomys fodiens*, Red Deer *Cervus elaphus and* Roe Deer *Capreolus capreolus* are found within UK reedbeds and their behaviour suggests that they offer important refuges and benefit their numbers; but the only evidence for this is for Water Vole, for which reedbeds provide a refuge from Mink *Mustela vison* predation (Carter & Bright 2003; Macpherson & Bright 2010).
Birds	Marsh Harrier *Circus aeruginosus*, Bearded Tit *Panurus biarmicus*, Reed Warbler *Acrocephalus scirpaceus*, Sedge Warbler *A. schoenobaenus* and Common Crane *Grus grus* will almost certainly have benefited from the increased area of undisturbed reed, wetter reedbeds making access by some predators more difficult and an increase in the reed/water interface where some of them prefer to nest and feed. Grasshopper Warbler *Locustella naevia*, Savi's Warbler *L. luscinioides* and Cetti's Warbler *Cettia cetti* are associated with reedbeds, but are only likely to have benefited from Bittern management or habitat creation in larger reedbeds, where reed of a variety of ages and structures is available. These species require scrub and a dense litter layer, or a layer of dead vegetation. Bittern habitat management aims to reduce scrub and litter, so the needs of these warblers would have to be specifically taken into account in whole-site plans.
Fish	European Eels *Anguilla anguilla* should benefit from the availability of a greater number of freshwater sites close to the coast. However, the high degree of hydrological management at many of these sites has meant that elvers may be able to access them only if elver passes have been provided or there is more sympathetic water management. There is little evidence as to how much eels have benefited in practice. Species such as Minnows *Phoxinus phoxinus*, Three-spined Sticklebacks *Gasterosteus aculeatus* and Rudd *Scardinius erythrophthalmus* will have benefited from Bittern management where water levels have been raised or the beds lowered and dykes profiled to allow the fish access to the reedbeds, and, especially, where new pools, meres and deep-water winter refugia have been created.
Amphibians	Common Frogs *Rana temporaria* use seasonally flooded areas, Smooth Newts *Lissotriton vulgaris* use well-vegetated ditches and Common Toads *Bufo bufo* use ditches, so increases in the extent of these habitats associated with reedbed restoration activity should be beneficial. However, increased fish stocks to benefit Bitterns may be detrimental to these amphibians; Great Crested Newts *Triturus cristatus* in particular are very sensitive to fish predation.
Lepidoptera	Reed Leopard *Phragmataecia castaneae* is considered a vulnerable moth which feeds on reed stems. Reed Dagger *Simyra albovenosa* is a litter-dwelling reedbed specialist. Adults of both species have been trapped at sites created using EU LIFE funding with Bittern requirements in mind. There are a number of other moth species associated with reedbeds, for example Flame Wainscot *Mythimna flammea*, Fenn's Wainscot *Photedes brevilinea*, White-mantled Wainscot *Archanara neurica*, Obscure Wainscot *M. obsoleta*, Twin-spotted Wainscot *A. geminipuncta*, Brown-veined Wainscot *A. dissoluta*, Silky Wainscot *Chilodes maritimus*. It is not known how these species have or have not benefited from reedbed works associated with Bitterns. To the extent that new reedbeds have been created and the life of 'mature' reedbeds has been extended by setting back seral succession, we might expect that, overall, they will have benefited.
Diptera	Scarce diptera *Cryptonevra nigritarsis and Sphaerophoria loewi* are associated with *Phragmites*, and may have benefited from reedbeds created and managed for Bitterns, having been recorded at a site created with Bitterns in mind.
Coleoptera	A nationally scarce carabid ground beetle *Paradromius longiceps* is a reedbed specialist. It has been recorded from dry reedbed at a site that also has successful breeding Bitterns.

UK BAP Bittern targets 2010–2030

BOX 6

	Number of booming males	Number of sites with booming males	Booming males not at risk of saline incursion
2010 actual	87 England, 0 Wales	47 England, 0 Wales	38 England, 0 Wales
2010 target	58 England, 2 Wales	31 England, 1 Wales	22 England, 2 Wales
2015 target	74 England, 5 Wales, 1 Scotland	34 England, 2 Wales, 1 Scotland	34 England, 5 Wales, 1 Scotland
2020 target	110	44	66
2030 target	190	64	133

figurehead species, what is known of the needs of many others have been built into the creation, restoration and management plans.

In recognition of this deficiency of information, a new research project, *Bringing Reedbeds to Life* (see www.rspb.org.uk for details), jointly funded by RSPB and Natural England, is underway and, for the first time, will allow a quantitative assessment of how reedbeds benefit wildlife other than Bitterns. This information will be particularly useful for invertebrates, which are probably the most difficult group to study and for which we have least information.

A future for Bitterns in the UK

The bird conservation community should be rightly proud of all that has been achieved for Bitterns, for reedbeds and for their associated wildlife. The original UKBAP targets for both Bitterns and reedbeds were met – and met well ahead of time and, with the exception of booming in Wales, the targets for 2010 have also been met (Box 6). However, we should not be complacent, for there remains much to be done to provide a secure future for Bitterns in the UK. Although we have already exceeded the UK BAP targets for England, a considerable new effort will be required if the targets for Wales and for Scotland are to be met. Even in England, although we are close to achieving our 2020 numerical targets we must remember that we have not achieved them quite yet. Even at currently successful sites, we must keep a close eye on the four essential components of Bittern conservation:



Dave Rogers

56. The extraordinary sight of a female Eurasian Bittern *Botaurus stellaris* feeding one of its youngsters out in the open at Stodmarsh, Kent, in September 2011. Similar events were witnessed at Thornham, Norfolk, in June 2011. With increasing numbers of Bitterns and of digital camera-wielding birdwatchers, we may be able to share more such unusual sights and come to learn more of the habits of these exceptionally secretive birds.



Andy Brown

57. Reconciling the needs of reed cutters with those of Eurasian Bitterns *Botaurus stellaris* at more sites may be one means of ensuring that the future management of reedbeds is both affordable and sustainable. Here thatching reed lies cut and bundled ready for removal at Cley, Norfolk, in March 1996.

the reedbed habitat, seasonal water levels, available and sustainable fish populations, and the presence of predators such as Mink. In particular, renewed focus on the dynamics of fish populations in often closed and highly managed sites and the relationship between seasonal water levels and reedbed health will almost certainly pay dividends. We have now built a wealth of experience of managing reedbeds; however, the costs of retarding or setting back seral succession are considerable and all those with responsibility for reedbed management must ensure that these costs are met. Greater consideration thus needs to be given to forms of 'sustainable' management, perhaps involving commercial reed harvesting in a way that is compatible with biodiversity conservation. There is a ready, hungry and growing market for roof thatching material that is currently fed largely from abroad but it remains to be seen whether the gulf between the 'needs' of reed harvesters and of Bittern conservationists can be reconciled – the former prefer an annual or short-rotation cut while the water levels are drawn down in late winter and early spring, whereas Bitterns require long-rotation reed stands with high water levels in late winter, spring and early summer.

There is, of course, considerable merit in extending the area of wetland within which the important Bittern reedbeds sit and, especially, in trying to reconnect reedbeds and their floodplains with the rivers that should feed them. However, progress on these grand, landscape-scale initiatives is slow, and substantial and costly management intervention will be needed for many years before 'natural processes' can operate at a landscape scale and take over again from the hand of humans.



Andy Brown

58. A fine line – often a thin strip of sand or shingle – separates some of our most important Eurasian Bittern *Botaurus stellaris* reedbeds from the open sea, as here at Easton Broad, Suffolk, in September 1997.

Effort in creating new areas of reed needs to continue and, indeed, must accelerate. This is because many of our largest reedbeds – those containing a substantial proportion of the national Bittern population – are in coastal East

Anglia and highly vulnerable to tidal inundation. New reedbeds will thus need to be created inland, in low-lying areas capable of holding large amounts of fresh water. New areas will be needed both to ensure that ambitious biodiversity targets are met and to compensate for those key sites that will be lost as the coast is intentionally realigned to protect it and the surrounding human population in the long term. We shall also need to encourage a move westwards and northwards to ensure that the new reedbeds we create are likely to be *wet* reedbeds and remain so over the long term, given that the climate of the east and southeast, where most of our Bitterns are currently found, is predicted to change towards drier springs and summers, which are times critical to the Bittern lifecycle. This should give even more legitimacy for greater restoration and creation activity in Scotland, Wales and Ireland.

Our aspirations for Bitterns, as expressed by our biodiversity targets, have been integrated into those for reedbeds and for freshwater wetlands more broadly. There is now a well-established national 'vision' for wetlands (Wetland Vision 2008), which takes account of UKBAP creation targets and requirements resulting from the likely consequences of sea-level rise and other effects of climate change. It encourages an ambitious, large-scale approach to wetland creation over a 50-year period. The Environment Agency has also initiated the Regional Habitat Creation Programme (RHCP), which identifies land suitable for wetland creation in cases where there is a statutory need to replace land lost from Special Protection Areas after necessary management works have led to saline inundation of coastal fresh waters (Huggett *et al.* 2006). The realisation of the Wetland Vision and the RHCP will do much to ensure that Bitterns and the reedbeds they inhabit will have a secure future in the UK.

A number of large-scale wetland creation projects, which will result in the creation of a very significant area of new reed suitable for Bitterns, are currently underway, with the £6 million funding from Natural England's Wetland Vision programme being matched by other funds raised by project consortia. Among the larger of these projects are the 'Wissey Living Landscape' spearheaded by the Norfolk Wildlife Trust, the Humberhead Levels Partnership led by Natural England, the Midland Meres and Mosses project led by the Shropshire Wildlife Trust, the Willow Farm Project in the catchment of the River Glen led by Lincolnshire Wildlife Trust, and initiatives in the Lyth Valley in Cumbria and Somerset Levels that are RSPB-led. Three much larger-scale projects are in the early phases of development in the East Anglian Fens. RSPB and Hanson aim to create 700 ha of wetland once mineral extraction has ceased in the vicinity of Needingworth and Over (Cambridgeshire) and the aim is for much of this to be reedbed suitable for Bitterns. Nearby, the National Trust has an ambitious plan for wetland creation around its Wicken Fen reserve, with a footprint of some 5,500 ha, and to the north, the Wildlife Trust for Bedfordshire, Cambridgeshire and



Andy Brown

59. Many reedbeds important to Eurasian Bitterns *Botaurus stellaris* are in coastal areas highly susceptible to saline inundation, such as this one at Cley, Norfolk, in March 1996. While reedbeds may recover from periodic incursions, rising sea-levels have very significant implications for the long-term future of Bitterns in this country.

Northamptonshire, Natural England, the Environment Agency, Huntingdon District Council and Middle Level Commissioners are creating the vast 'Great Fen' on an area of over 3,700 ha, with 1,500 ha of new wetland already in the first phase of establishment on former agricultural land (itself, of course, a former wetland) in the northeast of the project area where it links two existing wetland NNRs at Woodwalton and Holme Fen. The fact that these large-scale projects are already underway should be good news for Bitterns because we know from recent experience that it takes about a decade before new reedbeds are colonised by Bitterns. Therefore, providing that a sufficient area of suitable reed is in place by 2020, we should be on course to meet our 2030 targets.

The Bittern will always require a considerable effort to retain it as part of our avifauna. Site managers will need to remain well informed of conditions in their reedbeds by conducting regular audits of water quantity and quality, of reed extent and structure, and of fish and amphibian populations, in addition to conducting essential monitoring work on Bittern numbers and productivity. The costs will not be insubstantial but the gains – for Bitterns, for reedbeds, for wetland biodiversity more broadly and for the growing number of people who visit and rejoice in our new and rejuvenated wetlands – will be immeasurable.

Acknowledgments

Bittern monitoring and conservation action in the UK has involved a large number and wide diversity of committed individuals. Their number include many researchers, site managers, landowners and surveyors – both professional and voluntary. We trust that the start of recovery, described here, is sufficient testimony to their sterling efforts. The early insights into Bittern ecology and the promotion of conservation action for Bitterns owe much to the work of Glen Tyler, Ken Smith and Paul Jose. The UK Bittern monitoring scheme is funded by RSPB and Natural England as part of its Action for Birds in England programme.

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Graham Catley

60. A Eurasian Bittern *Botaurus stellaris* is seen here over the Humber reedbeds in February 2007, with the iconic Humber Bridge in the background.

Eagle Owls in Doñana: a conservation dilemma or not?

Vincenzo Penteriani, Rui Lourenço and Maria del Mar Delgado

Abstract The recent increase in the numbers of Eagle Owls *Bubo bubo* in Britain has led to widespread concern about the potential impact of this top predator on populations of other birds and mammals. We present data on the recent colonisation by Eagle Owls of the Doñana protected area, in southern Spain. The preliminary results provide a relevant case study for analysing the increasing Eagle Owl population in Britain. We describe population density and distribution, breeding biology, diet, home-range behaviour and natal dispersal of the species. Four years of research have highlighted the complexity of the situation in Doñana, and suggest that decision-makers should act with extreme caution when contemplating population control.

Introduction

The increasing population of Eagle Owls *Bubo bubo* in Britain has generated much debate over the potential conflicts that might arise from the presence of this large predator among the communities of British birds and mammals (e.g. Melling *et al.* 2008, Toms 2010). In terms of the origin of British Eagle Owls, several lines of evidence point to human involvement, particularly through the escape of individuals from falconers (as happened with Northern Goshawks *Accipiter gentilis* in the twentieth century; Anon. 1989). Even if it is not possible to discount natural colonisation completely, the captive origin of this population (or part of it) seems plausible, given the long history of captive Eagle Owls in Britain (reviewed by Melling *et al.* 2008).

The concerns and fears about Eagle Owls in Britain have provoked animated debate among and within conservation groups, leading some to lobby for a cull of the species. In late 2010, the UK Environment Minister decided not to take any action other than continued monitoring of the situation, highlighting the need to obtain more detailed information on population status and potential impacts on native wildlife (e.g. *Brit. Birds* 104: 49–50). On the basis of the available literature, it seems that good data are lacking on the number and spacing of breeding pairs, diet, reproductive success and natal dispersal; all of these, but the last in particular, are central to understanding and predicting the future spread of an Eagle Owl population, and the impact on other wildlife.

With the aim of providing information on some of the potential scenarios that may occur in Britain in relation to increasing numbers of Eagle Owls, we present data on a colonising population of Eagle Owls in southern Spain. Although local conditions are clearly different from those in Britain, we believe that the preliminary results of our research provide a useful case study.

Recent colonisation of Doñana by Eagle Owls

In the late 1990s, the Eagle Owl was recorded for the first time as a breeding species in the Doñana National Park (hereafter simply

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Doñana), in Andalusia, southern Spain. Although high-density populations of Eagle Owls occur in the nearby hills, less than 100 km from Doñana, the species had never been recorded within the protected area, despite the many research projects undertaken since the 1960s. Although molecular research on the origins of those individuals that colonised Doñana is ongoing, some evidence supports the possibility of a human component in the process. Following the opening of the Rescue Centre of Bolín in 1975, at least 12 Eagle Owls from the hilly areas of Huelva, Seville and León were admitted. That centre closed in 1988 and was replaced by the Rescue Centre of Acebuche (situated within the national park), which received increasing numbers of Eagle Owls until 2006. Most of these were subsequently released far from Doñana, but some individuals escaped from the facility in the early 1980s, and these may have been the first Eagle Owls to be observed in Doñana (during 1982–85). The greatest number of escapes occurred in 1990 and, from 1996, the number of Eagle Owls observed in the protected area increased, and breeding was first recorded.

Human involvement in the Eagle Owl colonisation of Doñana is supported by the natal dispersal patterns we recorded in a neighbouring population, in which individuals dispersed only a few kilometres from their natal area and never the distance necessary to reach Doñana (Delgado & Penteriani 2008; Delgado *et al.* 2010; Penteriani & Delgado 2011). Moreover, it is difficult to understand why the Eagle Owl, a predator that in southern Spain relies mainly on Rabbits *Oryctolagus cuniculus* (Delibes & Hiraldo 1981; Penteriani *et al.* 2008), began to appear in Doñana immediately following a population crash of Rabbits in the area.

A major concern of those involved in the management of this protected area was the potential (negative) impact of Eagle Owls on the communities of birds and mammals of Doñana. It was clear that an understanding of the characteristics and dynamics of this new population was a necessary prerequisite to any decisions on human intervention. Consequently, in 2005, the Doñana Natural Park and the Estación Biológica de Doñana (Spanish Council for Scientific Research (CSIC)), with financial support from the Consejería de Medio Ambiente of the Junta de Andalucía, began a preliminary four-year study on the density and distribution, breeding biology, diet, home-range behaviour and natal dispersal of the species.



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61 & 62. Typical breeding sites of Eagle Owls *Bubo bubo* in Doñana: small patches of Eucalyptus close to the marshes and areas of mature pine forest; March 2005.

Characteristics of the Eagle Owl population breeding in Doñana

Density and distribution of breeding pairs

Eagle Owl breeding sites were located using various census techniques. Taped calls were played at 1-km intervals along transects of the entire region, to obtain a general idea of breeding distribution as a baseline for more detailed surveys. These transects were supplemented by visits to listen (passively) for territorial males and females at sunset and sunrise from September to March during 2006–08, at a total of 275 listening points. In spring and early summer, those points were revisited to detect the calls of juveniles in their post-fledging dependent period (at 100–150 days old; Penteriani *et al.* 2005; Delgado & Penteriani 2007; Delgado *et al.* 2009). These sessions enabled detection of previously unknown breeding areas and an estimate of reproductive success in breeding areas where the location of the nest was unknown. Finally, potential nesting areas were visited with the aim of inspecting nest-sites.

As a result of preliminary searches, we established the location of 13 breeding sites and six potential reproduction areas (i.e. where either a calling male or a calling pair had been detected, even though we did not find the occupied nest), corresponding to a breeding population of at least 19 pairs. The mean distance (± SD) between neighbouring occupied nests was 3.9 ± 0.4 km, with a minimum distance between nests of 3.4 km. It is worth noting that the most difficult aspect of the work was verification; many reports that we investigated, of calling individuals, incubating females and prey remains/pellets, were found to concern Long-eared *Asio otus* or Tawny Owls *Strix aluco*. This suggested to us that the impression of a 'huge' Eagle Owl population in Doñana was incorrect, and that this impression had contributed to increased apprehension about the possible negative effects of this predator.

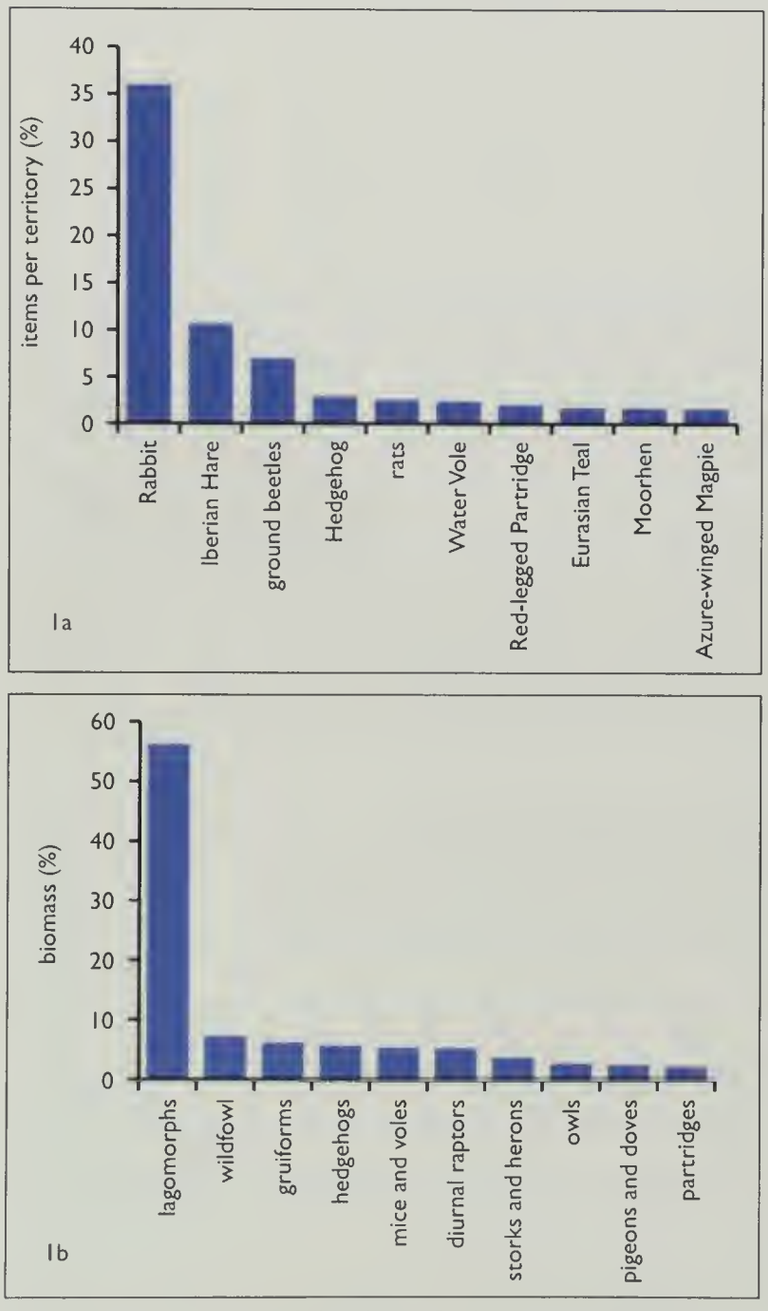


Fig. 1. Main features of the Eagle Owl *Bubo bubo* diet in Doñana. Fig. 1a shows frequency (% of items identified per territory) of the ten most frequent prey species (accounting for 67% of all prey items). Fig. 1b shows biomass contribution of the ten most frequent prey orders (94% of all prey).

Several pairs of Eagle Owls in Doñana bred on the ground but most used old nests of other species: raptors, storks and herons. In addition, since Eagle Owls breed earlier than many other raptors, particularly migrants such as Red Kites *Milvus milvus*, Black Kites *M. migrans* and Booted Eagles *Aquila pennata*, some raptors (re)used nests previously occupied by Eagle Owl pairs in the same season. Support for a relatively low density of Eagle Owl breeding pairs in Doñana is

provided by the frequent use of alternative nest-sites between years, which would have been more difficult in a more densely distributed population. At seven of 13 breeding sites observed, the same pair used an alternative nest-site in the following year up to a kilometre or more distant.

Breeding phenology and reproductive success

Laying dates ranged from mid December to the end of March, with variation evident between pairs, and also by pairs at the same site in different years. During 2001–08, the mean (± SD) productivity of the population was 1.5 ± 1.0 fledged young per breeding pair (range 1–3 young). Reproductive success was lower than in the surrounding hilly areas, where study pairs averaged more than two fledged young per attempt, range 1–4 (Penteriani & Delgado unpubl. data).

Diet

Periodic visits to 19 nest-sites throughout the year resulted in the collection of 1,752 prey items, which were analysed following Lourenço (2006); the results are summarised in fig. 1. The bulk of the diet, in terms of biomass contribution, was composed of lagomorphs, with Rabbits comprising 44.1% and Iberian Hares *Lepus granatensis* 11.7% of the total. Waterfowl were the second most frequent prey group (7.0% of consumed biomass), followed by gruiforms – Moorhen *Gallinula chloropus*, Purple Swamp-hen *Porphyrio porphyrio* and Common Coot *Fulica atra* – which comprised 5.9% of biomass.

Predators, both birds and mammals, were relatively rare in the diet of the Doñana Eagle Owls; we recorded seven species of diurnal and four species of nocturnal raptor in prey remains. The mean frequency of diurnal raptors in the diet was 2.7% (of the items identified), somewhat higher than the mean value recorded for Europe of 1.2% (Lourenço *et al.* 2011), which translated into a biomass contribution of 5.0%. The most commonly predated diurnal raptors were Black Kites, Red Kites and Common Buzzards *Buteo buteo* (2.6%, 0.9% and 0.5% of total biomass,



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63 & 64. Most of the Doñana Eagle Owls *Bubo bubo* use stick nests built by other raptors (adult on nest here in May 2004) but ground-nesting pairs are not uncommon (two young at a nest in May 2007).



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65. Breeding female Eagle Owl *Bubo bubo* close to a nest in Doñana, February 2007.

respectively). The mean frequency of owls in the diet was 2.5% (mean value for Europe 2.4%; Lourenço *et al.* 2011), corresponding to a biomass contribution of 2.4%. Barn *Tyto alba* and Tawny Owls each accounted for 0.9% of total biomass.

Among mammalian carnivores, we recorded only young animals (three Red Foxes *Vulpes vulpes*, a feral cat *Felis catus* and two unidentified canids, probably young Foxes), which formed 0.4% of items identified (and 0.8% of biomass), lower than the mean consumption of mammalian carnivores recorded for the Eagle Owl in Europe (0.8%; Lourenço *et al.* 2011).

In summary, the percentage of smaller avian predators in the diet of Eagle Owls in Doñana (5.2%) was slightly higher than the mean value for Europe (3.6%) but similar to that recorded in many European studies (Lourenço *et al.* 2011); the contribution of such smaller predators to the diet as a percentage of total biomass (7.4%) was minor; and predation of other raptors occurred mainly in those territories where the latter were particularly abundant (for example, the density of breeding Black Kites in Doñana is one of the highest in Europe).

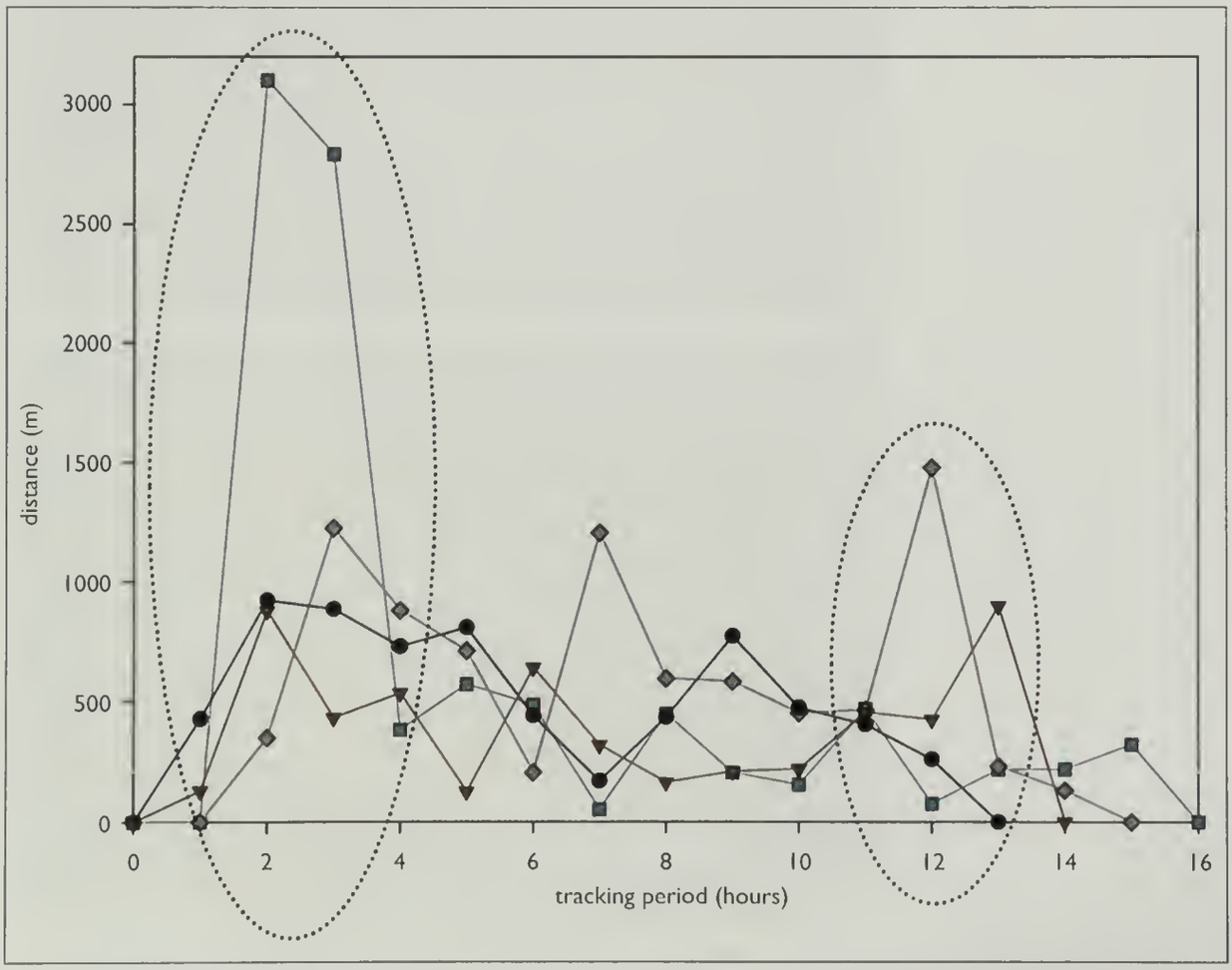


Fig. 2. Night-time movement patterns of four breeding Eagle Owls *Bubo bubo* in Doñana derived from radio-tracking. The two peaks of activity correspond to sunset and sunrise.

Home-range behaviour and movement patterns

During 2006–08, we radio-tagged five breeding Eagle Owls (three males, two females) from four different nest-sites. Tagged birds were followed continuously from one hour before sunset to one hour after sunrise and during the entire year, when we collected 55 nights of radio-tracking data (n=545 h of radio-tracking). For full details of this aspect of the study, see Penteriani *et al.* (2008) and Penteriani & Delgado (2011).

Breeding birds showed well-defined movement behaviour during the night and throughout the year. During the night, there were two peaks of activity, corresponding with sunset (mean ± SD, 1,464 ± 1,027 m), which probably reflected movements towards the hunting areas after vocal displays (Penteriani *et al.* 2008), and sunrise (351.3 ± 231.2 m), which included the return flight to the diurnal roost close to the nest (fig. 2). During the year, the owls moved relatively short distances (340.6 ± 214.8 m) during the pre-laying period, when most of the interactions between mates occurred in the proximity of the nest. Distance travelled decreased in males during the incubation period (240.7 ± 172.7 m). In contrast, during both the nestling and the fledging periods, when feeding and hunting activities increase, breeders of both sexes moved greater distances (nestling = 533.4 ± 428.3 m; fledging = 483.1 ± 252.3 m).

Natal dispersal and juvenile movement patterns

Dispersal can be defined as a three-phase process, characterised by well-defined behavioural shifts (Adriaensen *et al.* 2002; Hanski & Gaggiotti 2004; Delgado & Penteriani 2008): (1) *start*, when individuals leave their natal area; (2) *wandering*, when dispersing individuals search for new areas before temporary settlement; and (3) *stop*, when individuals settle – occupying a region for a long period of time relative to the entire dispersal process, or a breeding territory. During 2006–08, we radio-tagged 33 juveniles (9 in 2006, 15 in 2007 and 9 in 2008) from 11 nests, when the birds were c. 35 days old; they were located every 7–10 days (for more details see Delgado *et al.* 2010 and Penteriani & Delgado 2011). Dispersal began in late August (mean date 21st August), when the mean age of juveniles was 170 days; similar dispersal ages have been recorded in a Spanish (Delgado *et al.* 2010) and a Swiss (Aebischer *et al.* 2010) population. Juveniles prospected throughout Doñana, although it was clear that certain areas were preferred during both the wandering and the settlement phases; the mean dispersal distance (± SD) was 13.1 ± 7.7 km (males = 12.5 ± 6.5 km; females = 17.7 ± 9.1 km). In the three study years: (a) only 8% of juveniles reached the stop phase and settled in a more fixed or permanent area; (b) 40% of dispersing owls died during the wandering phase; (c) 4% remained in the wandering phase; and (d) the remaining 48% moved outside the Doñana area.

Eagle Owls in Doñana: a real conservation dilemma or not?

The arrival of Eagle Owls in Doñana was considered a potentially difficult problem from the outset. Faced with various possible ways of approaching the issue, the Spanish authorities opted to assess the need for human intervention by evaluating the potential impacts of Eagle Owl colonisation as accurately as possible. Four years of research represents just the first step in understanding



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66. A fledgling male Eagle Owl *Bubo bubo* wandering into the area around the nest for the first time, July 2005.

the basic features of this new population of Eagle Owls.

Some important points are highlighted by the preliminary data:

1. The mean distance between pairs (almost 4 km) and the population distribution within Doñana suggest a population that is smaller than was first imagined. The rather even distribution throughout Doñana and the misidentification of other owl species probably created the (erroneous) impression of a much higher density of birds. This emphasises the need for caution when estimating the potential size of a new population.

2. Knowledge of reproductive success and juvenile mortality is crucial to understanding the dynamics of colonisation. Despite the habitat heterogeneity of Doñana, and the existence of a Rabbit population (one of the most important prey species for Eagle Owls), we detected relatively low reproductive success and high juvenile mortality during dispersal, which translated into a relatively low rate of increase.

3. Although Doñana has one of the highest densities of raptors in Europe, predation of smaller raptors was within the range recorded for other European areas (and concerned only the most abundant species in the immediate vicinity of an Eagle Owl nest). Evidently: (a) although healthy populations of other raptors can coexist with Eagle Owls, small populations that are already limited by other factors may be more vulnerable; and (b) non-lethal effects (e.g. redistribution of raptor nests around Eagle Owl breeding sites or alterations in the use of space by smaller predators) may also occur. The estimation of these non-lethal effects will be one of the priority aims of our future research in Doñana.

4. The research has clearly shown that many elements have to be considered when a colonisation occurs, and that detailed analysis should be undertaken before any decision is made on the future of Eagle Owl populations.

Four years of research have highlighted the complexity of the colonisation of Doñana by Eagle Owls but any decisions, in terms of population control, remain difficult at present. However, so far we have been unable to detect any immediate negative effect that could justify intervention to regulate numbers and/or redistribute this predator in Doñana. In relation to Eagle Owl establishment in Britain, our experience suggests that a cautious approach is sensible, to avoid interventions that may have unexpected effects. Clearly, one of the main concerns about the establishment of a new breeding population of Eagle Owls is its potential for a negative impact on native fauna. Although further work is required, our initial research in Doñana suggests that such fears may not always be justified and that this species is quite capable of moving into a new area and living alongside healthy populations of predatory birds.



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67. Lagomorphs represent the most important food resource for Eagle Owls *Bubo bubo* in Doñana; April 2005.

Acknowledgments

We thank Fernando Hiraldo, Director of the Estación Biológica de Doñana-CSIC, and Curro Quirós, Director of the Natural Park of Doñana, for promoting scientific research into the main characteristics of Eagle Owl colonisation before management/conservation decisions are made. We also thank Consejería de Medio Ambiente, of the Junta de Andalucía, for financially supporting our study (research project no. 700/2005/M/00./). We thank Rocío Astasio (EBD), Cristina Ramos (EBD) and Francisca Rocío Martínez Fara (PN Doñana) for their help in the many logistical tasks, and Enrique Alés, José

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William OWLlace

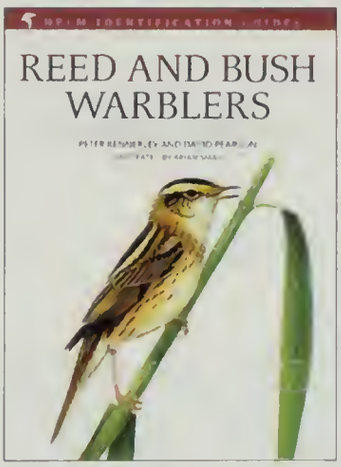
Rui Lourenco

The *BB*/BTO Best Bird Book of the Year 2011

British Birds and the British Trust for Ornithology announce the winner of the Award for Best Bird Book of the Year. All books reviewed in *BB* or the BTO publications *BTO News* and *Bird Study* (and on the BTO website www.bto.org) during the year 2011 were eligible for consideration for this Award.

Our six judges assembled as usual in a small room at the Hayes conference centre, on the Friday afternoon before the BTO's Swanwick conference. Before us were the books we had shortlisted during correspondence over the previous few weeks. Our annual get-together is a chance to spend an intense afternoon poring over and discussing the best bird books of the year – a prospect any bird enthusiast would relish – but meeting our challenge, to agree on a ranking for up to six titles, is not always straightforward. There are no objective rules to fetter the judges' discretion, and the candidates' diversity of style, content and purpose was particularly wide on this occasion.

We had no difficulty in identifying a range of great books that we could heartily recommend to readers of *BB* and members of the BTO. Reaching a consensus on a ranking was less easy than usual for this award, however: individual judges were variously attracted by academic flair, artistic brilliance, innovation and high purpose, leading to a remarkably broad and shallow distribution of votes. By the end of the afternoon we had found a deserving winner (though not even this was in every judge's top six), five runners-up and four further titles for special mention in this report. We now reveal the results.



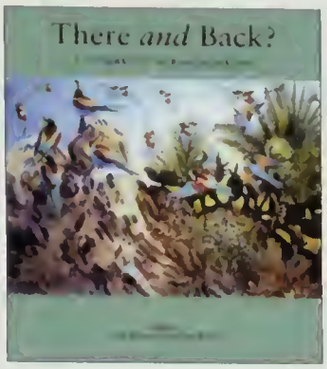
Winner

Reed and Bush Warblers By Peter Kennerley and David Pearson, illustrated by Brian Small. Christopher Helm, A&C Black, 2010.
Reviewed in BB *by Paul Harvey (*Brit. Birds *104: 168–170).*
The scope, style and erudition of this book could hardly be bettered! It casts light on many previously obscure genera and little-known species, with masterly attention to detail. The authors' unmatched field experience of these birds is evident throughout, as are their museum and laboratory skills. A failing, as Paul Harvey noted in his review, is the poor reproduction of some of Brian Small's brilliantly executed plates: most judges felt, however, that this small lapse on the part of the publisher should not outweigh more than 700 pages on which we could find no fault.

2nd

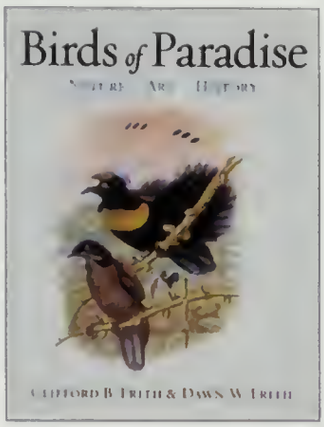
Feathers By Thor Hanson. Basic Books, 2011.
Though outwardly not very inspiring, this book is a hidden gem. We would urge all birdwatchers to buy and read it. It sets out in beautiful narrative prose, in the best tradition of nature writing, what feathers are – physically, biologically and in terms of human culture. The book is cheaply produced, sparsely illustrated and, disappointingly, given its subject, contains no colour. We all felt that it could have benefited from higher production standards but that, nevertheless, it deserved its high place in our ranking.





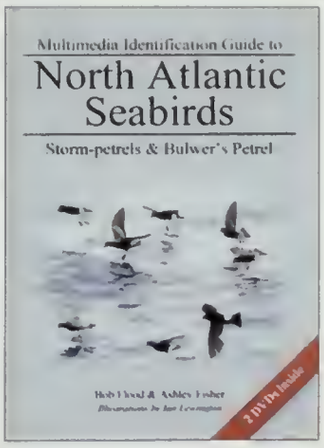
3rd

There *and* Back? A Celebration of Bird Migration
Edited by Andy Brown and Michael Warren. Langford Press, 2011.
Reviewed in BB *by Andy Stoddart* (Brit. Birds *104: 335–336*).
In the rapidly developing tradition of Langford Press, this book presents a lavish display of artwork brought together around a particular theme. As with *Arctic Flight*, another title in the Langford Press Wildlife Art Series and our winner in 2007, we found particular merit in the text of this volume as well as its artwork. Although the book is indeed a celebration, the relevance of the title's question mark frequently becomes apparent. The migration systems of birds are fascinating, yet fragile and highly vulnerable to broad-scale changes in climate and habitat availability at home and abroad. This book proclaims that message strongly and effectively, and potentially to new audiences.



4th

Birds of Paradise: Nature, Art & History
By Clifford B. Frith and Dawn W. Frith. Frith & Frith, 2010.
The birds of paradise, distributed as they are in a small region centred on New Guinea, are remote and exotic in British terms but, because they are among the most attractive and extraordinary of birds, they hold a special fascination. This book is a compendium of all aspects of knowledge of these birds, being partly a guide to the species and their biology and partly a history of their interactions with people and the art that they have inspired. It is rare for books of this kind to be so full of human interest. We applaud the broad scope of the concept and the quality of its realisation.



5th

North Atlantic Seabirds: Storm-petrels & Bulwer's Petrel
By Bob Flood & Ashley Fisher, with illustrations by Ian Lewington.
Pelagic Birds & Birding Multimedia Identification Guides, 2011.
Reviewed in BB *by Magnus Robb* (Brit. Birds *104: 750–751*).
Many birders will be drawn to this title by the two hours of unique and fascinating video material on the accompanying DVDs, but the book itself would stand alone as a very valuable contribution to our knowledge of the North Atlantic storm-petrels. Who knows which of these birds may be next to appear in British waters! Birders will no doubt be eagerly awaiting more multimedia guides from these authors in this new series.



6th

A Complete Guide to the Birds of Malta
By Natalino Fenech. Midsea Books, 2010.
Reviewed in BB *by Jonathan Elphick* (Brit. Birds *104: 101–102*).
The word 'complete' is well applied to this unusual book. The expected systematic listing occupies its second half, whereas the first 200 pages are a detailed and profusely illustrated essay on the relationships between man and birds in the Maltese islands. The author grew up in a hunting family and is able to explain the motivations of those who still trap and shoot birds in large numbers on the islands, often unsustainably and in direct contravention of local and European laws. From this perspective, he is able to identify some realistic and pragmatic ways forward for bird conservation.

In addition to our top six, we singled out four other books for special mention. Two of these are innovative local bird atlases: **The Breeding Birds of North-East Scotland** (edited by Ian Francis and Martin Cook, published by the Scottish Ornithologists' Club, 2011 – see *Brit. Birds* 104: 752–753) and **The Norfolk Bird Atlas: summer and winter distributions 1999–2007** (by Moss Taylor and John H. Marchant, BTO Books, 2011 – see *Brit. Birds* 104: 401). For its completeness as a scientific treatise on a group of birds of special interest in Britain, we commend: **The True Shrikes (Laniidae) of the World: ecology, behavior and evolution** (by E. N. Panov, Pensoft, 2011 – see *Brit. Birds* 104: 676–677). Finally, as usual in our reports, we are pleased to add a few words to the paean of praise already lauded to Vol. 15 of *HBW*: **Weavers to New World Warblers** (edited by Josep del Hoyo, Andrew Elliott and David Christie, Lynx Edicions, Barcelona, 2010 – see *Brit. Birds* 104: 225–227).The series has continued at its magnificent best for yet another year.

Acknowledgments

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John Marchant, Dawn Balmer, John Eyre, Peter Hearn, Robin Prytherch and Peter Wilkinson, c/o BTO, The Nunnery, Thetford, Norfolk IP24 2PU



BTO
Looking out for birds

Obituary

Simon James Aspinall (1958–2011)

Simon Aspinall made a major contribution to ornithology and conservation of the natural history of the Middle East, and particularly of the United Arab Emirates. That contribution was founded on his exceptional talents as a field naturalist, unrivalled knowledge of birds and ecological systems in the Middle East, personal and professional dedication to conservation, and his generosity in sharing ideas, information and his love of the natural world.

Simon grew up in London, spending hours birding at Beddington Sewage Farm, his local patch. His talent for birdwatching was evident before he was eight when he accompanied the Whitgift School Natural History Club on birding trips three years before he became a pupil at the school. Simon's education at Whitgift School and Purley High School in Surrey, followed by three years at the University of East Anglia reading Environmental Science, allowed him to place his well-developed field skills in all aspects of natural history alongside an academic training. His time at UEA allowed him to spend as much time as possible at Cley and on the north Norfolk marshes, the area that subsequently became his home.

During the 1980s Simon carried out survey work for the (then) Nature Conservancy Council and the RSPB on, for example, Corn Crakes *Crex crex*, breeding birds in the uplands, raptors (he was involved in the reintroduction of Red Kites *Milvus milvus* in Highland), and seabirds on the coast and at sea. In 1987 he was Assistant Warden on Fair Isle, during which time he became a fully trained ringer. At the end of his birding diary for 1987 he records 'The year will be remembered for its rarities – in species they were rather few but the number of individuals made up for that with one found every 3.2 days.' During the year he found a total of 75 individuals of 28 different species that were treated as rarities at that time, and his records are threaded through the 1987 BBRC Report (*Brit. Birds* 81: 535–596). His commitment to Fair Isle

continued and, in 2011, he published the results of his long-term study of the Fair Isle Wren *Troglodytes troglodytes fridariensis* (*Brit. Birds* 104: 312–324).

In 1993, Simon moved to the United Arab Emirates, where he quickly established a deep knowledge and love of the region, its cultures and people, environments and wildlife. He was based in the UAE for the next 17 years, working in bird conservation across the Middle East and becoming the first person to see over 400 species of birds in the UAE.

Simon wrote extensively. In 1994, he, Colin Richardson and Peter Hellyer co-authored the UAE chapter in BirdLife International's *Important Bird Areas in the Middle East*, a milestone in the region's conservation map and updated in 2006 (*Brit. Birds* 99: 546–561). His first major book on the birds of the UAE was *Status and Conservation of the Breeding Birds of the United Arab Emirates* (1996). This was based on many hundred hours of fieldwork and is a rich publication that has motivated conservation efforts. Simon was presented with the Sheikh Mubarak bin Mohammed Award, the UAE's premier environmental award, in 1997 in recognition of his contribution. The book has been revised twice, the second edition being in Arabic (2003) and the third edition as *Breeding Birds of the UAE* (2010).

More books followed: the completely rewritten second edition of *Field Guide to the Birds of the Middle East* (2010) with Richard Porter, containing descriptions of over 820 species, 120 more than the first edition; *Birds of the UAE: a guide to common and important species* (2011), with Salim Javed and Hanne and Jens Eriksen; and *Field Guide to the Birds of the United Arab Emirates* (2011), with Richard Porter, the first country guide to any of the Gulf states.

Simon was always generous in sharing his knowledge. In 2007 he joined BirdLife International in a mission to train local biologists from the UAE, Yemen, Jordan, Syria, Lebanon and Iraq in bird conservation. His passion for nature and birds greatly motivated all he met (and many that he did not meet but who knew his reputation).

Simon passed away peacefully at his home in north Norfolk on 31st October 2011, after a courageous four-year battle with motor neurone disease. Simon's life was cut too short but those who joined him in the field and experienced his knowledge and exceptional skills, and those who build on the foundation of his writing, understand that the quality and measure of his contribution far exceeds the quantity of time for which he lived. Simon will be remembered as a sincere friend, a mentor to many, and a shining example of a life in conservation. His contribution to conservation in the Middle East is a legacy that will last for many years.

Richard Aspinall
Sharif Jbour, BirdLife International



Sharif Jbour

68. Simon Aspinall in November 2007.

Letter

Occurrence of the Eagle Owl in the Mediterranean

Melling *et al.* (2011) discussed the status and movements of the Eagle Owl *Bubo bubo* in Europe, and highlighted the fact that even short sea crossings are extremely unusual. There have, however, been a small number of occurrences of this species on Mediterranean islands, which would have required a substantial sea crossing. As a breeding bird, the Eagle Owl is absent from these islands with the exception of Sicily, where it formerly bred but became extinct towards the end of the twentieth century (Cramp 1985; Iapichino & Massa 1989). Nevertheless, it is still occasionally recorded there, and from neighbouring islands, and it is believed that these records refer to vagrants rather than formerly captive individuals.

In Sardinia, there are no historical records of the Eagle Owl (Salvadori 1864; Bezzel 1957; Grussu 1996), while Alcover *et al.* (1992) found no evidence of this species in the fossil record. There are, however, three recent records of the nominate race of Eagle Owl from the island, each supported by a specimen. Grussu *et al.* (2000) reviewed the circumstances surrounding the observation of a presumed migrant drowned in the sea by Yellow-legged Gulls *Larus cachinnans* on 11th July 1991 and concluded that this bird was likely to be of wild origin (Grussu 2001). Eagle Owls occasionally reach Corsica: a bird was seen on several occasions in northern Corsica in April 1996, while calling birds were reported on four occasions between 1966 and 1977, and again in August 1995 (Thibault 1983; Thibault & Bonaccorsi 1999). In terms of shorter sea crossings, Giglioli (1890) noted the regular capture of Eagle Owls in early May on Capri (c. 5 km from the Italian mainland, where the Eagle Owl does not breed), while the species has recently recolonised the Marseille Islands, in southern France (Vidal & Bayle 1997).

Although absolute proof that the birds were of wild origin is lacking, the records of Eagle Owls in Corsica and Sardinia suggest to me that the species *is* capable of making substantial sea crossings.

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Notes

Great Cormorant taking Grass Snake

Non-breeding Great Cormorants *Phalacrocorax carbo* are seen regularly during the summer months on the River Gipping at Ipswich, Suffolk. On 14th July 2010, while birdwatching there, I became aware of vigorous splashing on the edge of the river, which is lined with reeds at that point. The cause of the commotion was a Great Cormorant with a Grass Snake *Natrix natrix*, about 80 cm in length, held firmly at about mid-length in its bill. The snake was alive and clearly identifiable by its slender form and large wide ventral scales as it writhed, coiled and uncoiled vigorously. The cormorant submerged and resurfaced twice, presumably releasing and recapturing the snake to reposition it for swallowing. By the second time it surfaced, it had partially swallowed the snake head first. With much of the snake's body and tail still protruding from its bill, the cormorant flicked its head back and up, then ducked its head underwater (perhaps to take on water to help swallowing), before once again stretching its neck, head and bill vertically skywards. This was repeated once more until the last protruding slip of the snake's tail disappeared. A bulging knot of snake and muscle moved slowly down the cormorant's still skyward-pointing neck. Shortly afterwards, the cormorant flew off downstream. I can find no mention in *BWP* of Great Cormorants eating snakes.

Peter Scotcher, 47 Riverside Road, Ipswich, Suffolk IP1 4AR

Oystercatchers feeding a Common Gull chick

On 3rd July 2010, a staff member at the fish farm base at Sandsound Voe, in the west Mainland of Shetland, phoned IS to say that since early June he had been watching a pair of Oystercatchers *Haematopus ostralegus* feeding an unfledged Common Gull *Larus canus* chick. We visited the site several times during the following few days, and although the birds were often out of view in dead ground, it was obvious that the waders were regularly feeding the gull chick, which they seemed to have adopted into their family.

Oystercatchers are one of the few wader species that will actively feed their chicks. Most waders lead their young into suitable feeding areas and the chicks feed themselves; while Oystercatchers frequently do this, they also provision their young by catching food items, often earthworms, which they present to the chicks by dropping them onto the ground for the chicks to pick up and eat. This ability to feed their young allows Oystercatchers to nest in unusual habitats, such as the flat roofs of buildings in cities such as Aberdeen, with the adults foraging in nearby sports fields, parks, etc. when the chicks are small.

Several pairs of Oystercatchers nest in rough grassland at Sandsound. The pair in question had two large chicks of their own, which were close to fledging when we saw them first, while the Common Gull chick was also close to fledging. The adults sometimes foraged close to the chicks, but more often in adjacent fields, flying back with food items for the brood, mainly earthworms. The Common Gull would beg and mew at the arrival of an adult Oystercatcher, and seemed to be fed as often as the Oystercatcher chicks. The gull tried to copy the Oystercatchers by probing the ground for food but was not successful, at least while we watched it. No aggression was observed among the chicks. Soon after they fledged, on 7th July, all of the birds left the area.

Both species nest commonly in Shetland but the nearest-nesting Common Gulls were on hill ground about 1 km away, with territorial pairs of Oystercatchers nesting between them and the foster pair at Sandsound, so it is difficult to see how the Common Gull chick joined the Oystercatcher family. As the first observation was reported to be in early June, the chicks would have all been very small on that date. Human intervention is one possibility, and egg-dumping

is another, although this is not thought to be a common practice in gulls (see, for example, Pennington 1993). Oystercatchers have been reported as caring for chicks of Ringed Plovers *Charadrius hiaticula* and Northern Lapwings *Vanellus vanellus* (Hampshire & Russell 1993; Dougall 1996; Dickson 2003), and also Herring Gulls *Larus argentatus* (Suttie 2001), but fostering a gull chick, apparently successfully, seems sufficiently unusual to place on record.

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Differentiating the calls of male and female Sand Martins

The problems with portraying bird sounds phonetically were set out at length by the editors of *BWP* in the first volume of the series (Cramp & Simmons 1977), and as I look forward to my 48th season with the species I still cannot decide which of the many Sand Martin *Riparia riparia* sounds are referred to by the phonetic renderings in Vol. 5 (Cramp 1988). The various recordings in BWP*i* perhaps also give the wrong impression. 'Colony calls' are indeed those given by the residents of a colony, but one that (communally) considers itself in imminent danger, judging by the intensity of the alarm calls, and so should perhaps be 'Colony alarm calls'. 'Calls' again portrays mainly alarm calls. The 'Song' (main one used by the male) is portrayed correctly and appears also to contain the very sharp call of a female reply.

To use song as a means of identifying males and females in a monomorphic species such as the Sand Martin requires that certain song types are used by only one of the sexes. In establishing this, it is crucial that a bird using a particular song type is identified correctly (and independently) as being of that sex.

A breeding site for Sand Martins has been built in my garden in Dumfries & Galloway (plate 69). This site, supported by a grant from Scottish Natural Heritage, consists of a small artificial pond above which there are three nestboxes, holding 120 nest holes in total. It was built specifically to allow observation of Sand Martin breeding behaviour without interference, with nest cameras allowing video recording in certain holes and also at the face. Nest cameras at this site have recorded many instances where a bird identified as a female Sand Martin (one carrying out the female role) has issued vocalisations matching those in fig. 1.

The best example, from which fig. 1 is derived, occurred when both members of a pair were facing the camera when the song was delivered (plate 70), at 22.02 hrs on 26th March 2009. The female (later identified as such when laying) first arrived at the site with another bird at 17.30 hrs on 16th March 2009 and entered the hole (in which a nest camera was fitted at 17.35 hrs), where she roosted for the night alone. At 10.15 hrs on 17th March, a male (later identified as

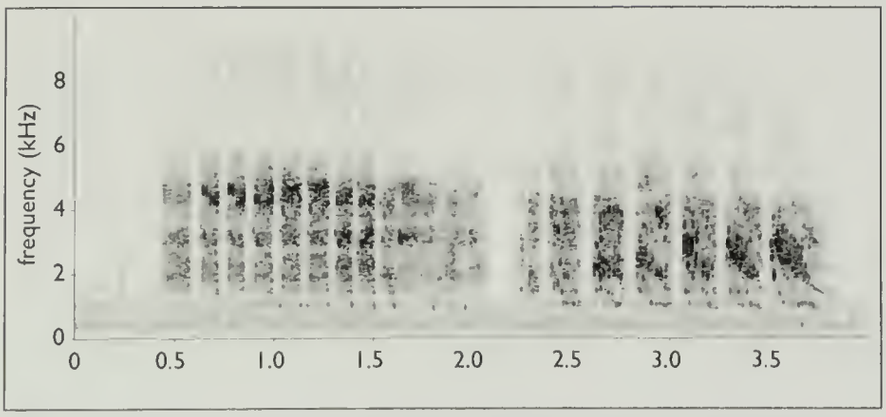


Fig. 1. Sonogram showing the calls of male (0–2.2 secs) and female (2.2–4 secs) Sand Martins *Riparia riparia* (see text).

such during mate-guarding and when he sat with the female as she was laying) entered the hole with the female and took possession of it.

The sonogram in fig. 1 shows the song of the male when woken by the female, and the female's reply. It can be seen that the female's reply starts at a pitch slightly below that of the male's song but whereas his remains at the same pitch, hers has a downward inflection to each note and, after the opening, each note starts at a slightly lower pitch than the start of the previous one. This song, peculiar to the female, is also delivered more slowly than the male's in this example, with four notes per second compared with the male's normal song of seven notes per second. Phonetically, it might be described as a descending 'crew, crew, crew' call delivered at different intensities and with a different number of notes depending on the anxiety level of the female at the time.

This song or series of notes is peculiar to the female Sand Martin in my experience, and in six or more years of following nest-camera video recordings I have not heard a known male deliver the song or notes. The call notes are so seamlessly fitted to the male's that, on many occasions, the two songs could be accepted as one. The song's function appears to be to identify the issuer as a female. When interacting with a male after entering a hole, its delivery will pacify the male; when challenged by a male at a hole entrance, it has a similar effect. Its other main use is to warn intruding females that there is a resident female in a nest hole (Kuhnen 1985 referred to a female call to warn other females about to enter a nest hole). This discovery might be thought of little value to birdwatchers, but this song, or one or more notes from the end of it, is used outside the nest hole. If the final note or notes of a Sand Martin's song has a querulous 'crew' or 'chew', then, in my experience, in cases where the sex was known, it was uttered by a female.



Edward Cowley

69. The man-made Sand Martin *Riparia riparia* colony in Dumfries & Galloway, May 2008.



Edward Cowley

70. Sand Martin *Riparia riparia* pair (male on left) whose songs are portrayed in fig. 1; Dumfries & Galloway, March 2009.

Acknowledgment

I thank C. R. du Feu for his comments on this note.

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Reviews



Die Vogelwelt der Insel Helgoland (The Birds of the Island of Helgoland)

By Jochen Dierschke, Volker Dierschke, Kathrin Hüppop, Ommo Hüppop and Klaas Felix Jachmann
OAG Helgoland, 2011
Hbk, 629pp, many photographs, graphs and maps
ISBN 978-3-00-035437-3. Subbuteo code M21186
£55.00 *BB* Bookshop price £49.50

Was the first Eastern Crowned Warbler *Phylloscopus coronatus* in October 2009 really Britain's first, or the second after Heinrich Gätke obtained a bird that was shot on Helgoland in 1843? And was Germany's first Cyprus Wheatear *Oenanthe cypriaca*, recently discovered after a bird collected on Helgoland in May 1867 was re-examined, not a British first instead?

Many British birdwatchers may not be aware of the British history of the tiny North Sea island of Helgoland. During most of Gätke's active period, Helgoland was British. Only in 1890 was the island 'exchanged' for Zanzibar to become part of Germany. The seabird cliffs, with Germany's only Common Guillemots *Uria aalge*, Northern Gannets *Morus bassanus* and sometimes even breeding Pied Wagtails *Motacilla alba yarrellii*, remind the visitor how close the island is to Britain.

Gätke's pioneering work led to the establishment of the 'Vogelwarte Helgoland' in 1910. Having gathered more than 170 years of bird migration data, Helgoland is considered one of the oldest bird observatories in the world and is famous well beyond Germany as one of the most popular Meccas for birdwatchers in Europe.

Since Gätke's magnum opus, *Die Vogelwarte Helgolaud*, was published in 1891, rather little in the way of an updated avifauna of the birds of Helgoland has emerged, other than a short annotated species list published by Gottfried Vauk in 1972. In the late 1980s, two of the main authors of this new book, Jochen Dierschke and his brother Volker, together with Frank Stühmer, a keen young birder from the island, revolutionised birdwatching on Helgoland. In 1991, the 'ornithological working group of Helgoland' was formed, which published regular reports summarising (for the first time) observations on the island that were made outside the observatory. And now, Jochen Dierschke and other authors finally present a full account of the present knowledge of the birdlife of Helgoland.

It is not just about rarities, although they inevitably feature strongly. Chapters on habitats and the extensive history of the island are followed by chapters on the breeding birds, migration and wintering birds, before each of the 426 species recorded on the island to date are covered in single-species accounts. Almost all of these accounts are accompanied by high-quality photographs and by graphs depicting the phenology and changes over years and decades, the latter mostly the work of co-authors Ommo and Kathrin Hüppop, who started work at the observatory in 1988.

The authors have managed to assemble an enormous wealth of data and provide the reader with unique analyses of trend data over 170 years. Odd and always admired rarities range from the Egyptian Nightjar *Caprimulgus aegyptius* from the nineteenth century and the Pale Thrush *Turdus pallidus* in 1986 to the Grey-necked Bunting *Emberiza buchanani* as recently as 2009. However, the real value of the book in my opinion is the trend data. Analyses of changes over the past 50 years provide trends for 66 species, of which 49 have decreased. Among them, not surprisingly, are Turtle Dove *Streptopelia turtur*, Wryneck *Jynx torquilla* and Tree Sparrow *Passer montanus*, but also Bluethroat *Luscinia svecica*. Only ten increased, such as Eurasian Sparrowhawk *Accipiter nisus*, Wood Pigeon *Columba palumbus*, Wren *Troglodytes troglodytes* and Common Chiffchaff *Phylloscopus collybita*. Even longer-term trends, made possible by using the accounts from Gätke as well as Rudolf Drost in the early twentieth century, reveal the sheer numbers of mass migration and falls of literally thousands of birds, such as an estimated 2,000 Ring Ouzels *Turdus torquatus* in one October night in 1934, or thousands of Common Redstarts *Phoenicurus phoenicurus* on spring days with a southeasterly wind. There were 1,500 Common Redstarts in May 1940, but such numbers have not been observed since, pointing to

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overall declines of this once-common species. More intriguing are the fluctuations in numbers of the Shore Lark *Eremophila alpestris* over the past 170 years. Hardly known from before 1847, the species increased rapidly to thousands during autumn migration at the end of the nineteenth century, declining in the early twentieth century but with hundreds again by the mid 1900s. After 1960 the species declined, increased again in the 1990s and has declined since 1999. The book reveals many more intriguing analyses of several species, drawing parallels with British birds, which readers will surely find interesting.

The text is mixed with thematic boxes on various topics and my favourite is the evocative description of nocturnal mass migration, again revealing the sheer numbers that used to be attracted by the lighthouse, at times estimated to be tens if not hundreds of thousands of birds, with several thousand thrushes, Common Snipes *Gallinago gallinago* and Woodcocks *Scolopax rusticola* collected by the locals on some nights.

The overall total of almost 7,000 ring-recoveries is outstanding. Interestingly, a map of Europe leaves hardly any white spots in the UK. Only in the northeast of Scotland have no birds ringed on Helgoland been recovered.

Although the text is in German, there are extensive summaries of each chapter, each caption and each species account in English. The Helgolandic summary is missing, but most of the common names are listed in Helgolandic.

The stunning photographs, all taken exclusively on Helgoland and several of them with some gentle humour, together with the many references and parallels drawn to British birds make this book a must-read, not only for German readers but all those interested in bird migration in Britain and across Europe. There are inevitably a few spelling mistakes, hardly worth mentioning, and I can highly recommend this book. For its size and the number of pictures and graphs the price of the book is reasonable. If you would like to support the work of the Helgoland Ornithological Working Group, you can order the book directly online from their website.

Christoph Zöckler



Der Baumfalke (The Hobby) (5th edn)

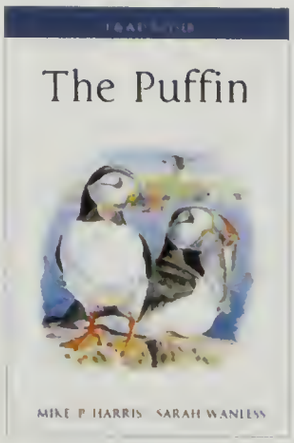
By Klaus Dietrich Fiuczynski and Paul Sömmer
Die Neue Brehm-Bücherei, No. 575, Westarp Wissenschaften, 2011
Hbk, 372pp, many colour photos
ISBN 978-3-89432-229-8. Subbuteo code M21185
£37.99 *BB* Bookshop price £34.00

This fully revised edition incorporates the results of the studies of the senior author in particular, conducted over several decades, and now fully up to date (including, for example, the latest results of satellite-telemetry studies – see *Brit. Birds* 104: 2–15). This impressive work is almost double the size of the previous edition and is now illustrated mainly with colour photographs. There is a comprehensive evaluation of the literature and the bibliography extends to 28 pages. The wealth of material treated, however, must not conceal the fact that many questions still remain unanswered. Very little is known about population density, migration behaviour and wintering, especially of the eastern populations. Only two ringing recoveries have been made in the regions south of the Sahara, even though thousands of individuals have been ringed in Europe over a period of several decades. The reasons for different population trends in different parts of Europe have not been explained yet either: whereas, for example, the population in Britain is increasing rapidly, and amounts to many hundreds of pairs, the population in the Berlin area is in decline.

This monograph on the Hobby, the most comprehensive of its kind to date, consolidates and summarises the current state of knowledge of the species, and is heartily recommended to all those interested in birds of prey, and with some knowledge of German.

Bernd-U. Meyburg

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The Puffin

By Mike P. Harris and Sarah Wanless
Poyser, 2011
Hbk, 256pp; 44 colour and 7 black-and-white photographs; 31 line-drawings
ISBN 978-1-4081-0867-3 Subbuteo code M02254
£50.00 *BB* Bookshop price £45.00

I was delighted to take on the task of reviewing this book, but slightly horrified to find that it was over a quarter of a century since Mike Harris had produced his previous monograph on this species. How time flies! I first met Mike Harris in the early 1970s, when the focus of his attentions was on the gulls and Manx Shearwaters *Puffinus puffinus* of the Pembrokeshire islands. He soon moved north to the Isle of May and has spent much of the last 40 years engaged in a long-term study of breeding (Atlantic) Puffins *Fratercula arctica* there and elsewhere. My first contact with Sarah Wanless came a decade later, during the first of a series of ten-yearly international censuses of Northern Gannets *Morus bassanus*.

I have always been a little envious of this couple who have managed to organise their lives to spend their summers living on enigmatic seabird islands carrying out detailed studies of the breeding biology and ecology of such interesting and attractive seabirds. They have shared their findings with the ornithological community through their prolific publication in the scientific literature, and with a wider readership through Mike's 1984 Poyser, *The Puffin*, and now in this joint publication.

A short introduction leads quickly to the main body of the work, 15 chapters and 186 pages of it. The first five chapters place the world's three puffin *Fratercula* species among the other auks, summarise the studies which have been carried out so far, and describe the appearance, development and moult of the (Atlantic) Puffin, and its distribution and status in Britain, Ireland, France, Iceland, the Faeroes, Norway (including Svalbard), Russia, Greenland, Canada and the USA. The book then gets down to the nitty-gritty of the (mainly) breeding biology of the species, with six chapters covering colony attendance, chick rearing and breeding success, behaviour, food and feeding, predators, pirates, parasites and competitors, survival of Puffins, and the Isle of May populations (where much of the research has been carried out by the authors). Finally, there are four chapters which deal with Puffins away from the colonies: the interactions between Puffins and people, other threats to Puffins, an overview of the present situation, and finally some insights into the future for the species.

The text of the main part of the book is enhanced by 28 informative tables and 78 figures – a significant and welcome increase on the 20 and 47 (respectively) in the 1984 edition. I was particularly pleased to see that long-standing Scottish seabird enthusiast Kenny Taylor was invited back to write the chapter on Puffin behaviour, as he did so ably in the 1984 edition. His contribution is invaluable.

What Puffins do during the seven months of the year when they are away from the breeding colonies is still something of a mystery. In the past, most information was obtained from rather few recoveries of ringed birds accumulated over many decades. However, the recent introduction of electronic data-loggers and other devices, which can be fitted on Puffins and retrieved later for downloading accumulated data, has opened up exciting possibilities for finding out more about this part of the Puffin's annual cycle. Chapter 12 covers preliminary findings from the new technology and shows an Isle of May Puffin spending much of its non-breeding time foraging in the northwest Atlantic south of Greenland and east of Newfoundland. No doubt the third edition of the book will have a greatly extended chapter on this topic!

The book is amply illustrated throughout. Developments in digital photography have inevitably led to an improvement in the quality of the colour photographs used (44, by many different photographers). I am pleased to note that these are used not just to provide beautiful portraits of Puffins, but to illustrate various activities and behaviours of these colonial and sociable little seabirds. Also included are several older black-and-white photos of historical interest. As in the first edition, Keith Brockie has provided many black-and-white line-drawings (and colour illustrations for the dust jacket). While all these are excellent, I have to say that I prefer some of his illustrations in the earlier book.

The 1984 edition contained just two appen-

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dices: one listing the scientific names of species mentioned in the book, and the other sources of the counts/estimates used. This edition contains 14 appendices (32 pages), covering the above topics but also a large amount of other data, including measurements of adult Puffins, chicks and eggs, fledging weights, timing of breeding and breeding success, diet, weights of fish prey species. The first edition contained just over 300 references, while this one has 525, which reflects the amount of work published on this species over the last quarter of a century. The reference list appears comprehensive, covering English and other language publications from across the breeding range of the Puffin from northeast Canada to Svalbard and northwest France. I did some random checks on the index and found it was comprehensive and worked well in locating the topics that I was searching for.

I have absolutely no hesitation in recommending this new edition of *The Puffin* to all who are interested in seabirds, especially this enigmatic and much-loved species. Those who have the first edition will find it well worthwhile acquiring this edition too, as so much has been learnt about the species in the intervening period.

Oscar J. Merne



The Bird Species/Die Vogelarten: systematics of the bird species and subspecies of the world. Volume 1: Charadriiformes

By Norbert Bahr
Media Natur, Minden, 2011
Hbk, 191pp
ISBN 978-3-923757-11-4 Subbuteo code M21184
£24.95 *BB* Bookshop price £22.45

There seem to be a lot of world bird lists available now. Between the authoritative 'Howard and Moore' (*The Howard and Moore Complete Checklist of the Birds of the World*, Helm), the widely used 'Clements' (*The Clements Checklist of the Birds of the World*, Helm), the rapidly evolving IOC World List (www.worldbirdnames.org) and the recent completion of *HBW* (*Handbook of the Birds of the World*, Lynx Edicions), not to mention any number of online systematic guides, there is no shortage of taxonomies and reference material available to serious ornithologists and birders alike. Now there is a new kid on the block, with the publication of the first volume of Norbert Bahr's *The Bird Species*, covering the Charadriiformes (shorebirds through to gulls, terns and skuas). So what unfilled niche in the market is this planned series of books aiming to fill?

Norbert Bahr was one of the compilers of the Howard and Moore 3rd edition, and the apparent decision to go it alone with a rival publication is initially puzzling. To read the blurb on the back cover, it appears to be modelled on, and is perhaps the heir to, the Peters' Checklist, published in several volumes between 1931 and 1987. The justification for producing the work as a series of separate volumes is apparently to keep each volume timely, to allow for rapid updating, and to allow space for more explanatory material and other information than is available in a single-volume world list. At face value, none of these reasons really stands up: each volume will date rapidly, it is difficult to imagine new editions being published before the series is complete, and although there is certainly a greater amount of background material and appended notes than are found in, say, Howard and Moore, the extra information does not represent an exponential increase. The book does, however, have a website where updates will perhaps be posted (www.thebirdspecies.com) and, ultimately, I guess that the amount of work involved with a systematic review of the world's birds is beyond the wit of a single person, no matter how driven, to do well in one go.

This book, and presumably the future series, is undoubtedly the product of drive, knowledge, enthusiasm and a deep conviction that taxonomy and correct nomenclature are central to ornithology. There is a short general introductory section that explains the significant issues relating to species level and higher order taxonomy that have been addressed during the production of the book. Species concepts are summarised, and the relative value of genetic and other classes of data underlying taxonomic changes are discussed briefly. Then follows the main systematic list. Each

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family is treated in turn, with a short explanation of the main taxonomic issues and relevant recent publications. There is a strong emphasis on new molecular work, without neglecting other morphological studies. The 'business end' of the species list is extremely thorough – for each genus, the author, year of publication and citation are given, with the type species and its author(s) named, and any synonyms for the generic name described similarly. Species are listed by current scientific name (with year and citation) and IOC English name, the scientific name under which the species was originally described, the type locality and range statements. Each subspecies gets a similar uncompromising treatment. The list is liberally peppered with explanatory footnotes (nearly 300 of them) offering information and citations relevant to the nomenclature and taxonomy employed.

In general the taxonomy is progressive and up to date and is strongly influenced by recent molecular studies. Whereas the Howard and Moore list is often perceived as being quite conservative with respect to adoption of new proposals, this volume is proving more willing to incorporate very recent recommendations. Not everyone will agree with all the species delineations and generic arrangements (and indeed some of them may, in future, be shown to be wrong), but there is nothing that is not at least defensible on the basis of current evidence. Perhaps the thing that will surprise readers, though, is the split of *Calidris* into several genera, recreating several unfamiliar scientific names such as *Pelidna alpina* (Dunlin), *Leimonites temminkii* (Temminck's Stint) and *Ereunetes minutus* (Little Stint).

The text is in both English and German, and there are some typos in the English version. However, the typos are minor distractions from what is, in the end, a comprehensive and extremely useful reference work. There is no indication about how many volumes are planned, or the timescale for their publication – the fact that only one new volume is coming in 2012 suggests this is a long-term project. As a stand-alone book it is an impressive piece of work that will be essential for anyone with a specialist interest in the systematics of this group of birds.

Martin Collinson



Birds, Blocks and Stamps

By Robert Gillmor
Two Rivers Press, 2011
Pbk, 55pp
ISBN 978-1-901677-79-9 Subbuteo code M21151
£12.50 *BB* Bookshop price £11.25

In 2010 Robert Gillmor was invited to design four series of six stamps for the new self-service stamp dispensers – Post and Go. These were issued by Royal Mail between September 2010 and September 2011. His A4 linocut designs are reproduced in this booklet at postcard size along with the final stamp-sized image. They are accompanied by Robert's text, which describes the processes by which each was achieved along with some preparatory sketches and ideas. The Blue Tit *Cyanistes caeruleus* design is used to explain the process, I would have liked to have seen one design evolve colour by colour, just for the magic of it. A must for Gillmor print enthusiasts, and anyone with an interest in bird art and design, and of course, stamp collectors. Nicely presented.

Alan Harris

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News and comment

Compiled by Adrian Pitches

Opinions expressed in this feature are not necessarily those of *British Birds*

Disney ensures fairy-tale ending for warbler story

In the 1960s, the Seychelles Warbler *Acrocephalus seychellensis* became one of the world's rarest birds when the population slumped to just 26 individuals, all on tiny Cousin Island in the Seychelles, in the Indian Ocean. Formerly, the bird had been more widely distributed in the Seychelles, but habitat destruction and non-native species brought the warbler to extinction everywhere apart from Cousin. But now the fortunes of the bird are looking much brighter, thanks to a programme to redistribute birds to other islands in the Seychelles.

In the latest move, 59 Seychelles Warblers have been transferred from Cousin Island Special Reserve to Frégate Island, thanks to an initiative led by Nature Seychelles. The move has been funded by a $18,000 Disney Worldwide Conservation Fund grant. Nature Seychelles is the RSPB's BirdLife partner in the Seychelles, an archipelago of 115 islands, some 1,500 km east of mainland Africa. Before the redistribution, the warbler was facing a huge threat of extinction, and a one-off event like a tropical storm or disease outbreak could have had a devastating impact on the species. The transfer was carried out to start a new breeding population on Frégate Island – a privately owned luxury resort – making it the fifth island in Seychelles to hold the warbler.

Nirmal Shah, CEO of Nature Seychelles, said: 'It will pave the way for this bird, once said to be "one of the rarest birds in the world", to eventually come off the Red List of threatened birds of the world. We have been trying to get this project off the ground for a very long time and we have to thank the company managing the island – Frégate Island Private – for agreeing to partner with and take the warblers.'

The operation involved a team from Nature Seychelles, the Seychelles Warbler Research Group, and Frégate Island. Birds were captured in the morning, transferred by helicopter and were released on Frégate by the afternoon of the same day. 'This way the birds are kept in captivity for the minimum amount of time and they have time to eat and drink on Frégate before nightfall,' said Dr David Richardson of the University of East Anglia, which forms part of the Seychelles Warbler Research Group.

Nesting on Frégate was expected within a couple of weeks of the transfer. The Seychelles Warbler Research Group will be monitoring this population for the next few years. 'Seychelles is an example of how science and conservation can go hand in hand, and this is a brilliant opportunity to continue studying the warbler's evolution and behaviour,' said Dr Richardson.

Whooping Cranes cleared for take-off

A flock of Whooping Cranes *Grus americana* has been given the go-ahead to complete its inaugural winter migration after a US agency lifted restrictions on the pilots, who fly ahead in a microlight to guide the captive-bred birds.

The Whooping Crane is Critically Endangered with around 400 individuals in the wild, most of which take a westerly migration route from Canada to wintering grounds in Texas. For the past decade reintroduced flocks have been guided along an easterly route to establish a new population of cranes.

This year's flight was stalled halfway along the migration route while the Federal Aviation Administration (FAA) investigated whether the 2,000-km guided flight to winter quarters violated its regulations. The FAA has now issued 'one-time exemption' to the pilots flying microlight aircraft with the cranes, which were halted in Alabama on their journey south from Wisconsin to two Florida refuges. The issue arose because the pilots are being paid by the conservation group Operation Migration, violating FAA regulations that pilots of microlights cannot be paid as they are not flying commercial aircraft.

Operation Migration is part of a public-private US/Canadian partnership aimed at re-establishing migrating flocks of Whooping Cranes. The species nearly became extinct last century when the population fell to just 15 birds in 1941. The main flight corridor for Whooping Cranes runs from western Canada to the Aransas National Wildlife Refuge in Texas. The current flight is part of an effort that started in 2001 to restart an eastern US flyway from Wisconsin to Florida, which is within the species' historical range.

The cranes are bred at the Patuxent Wildlife Research Centre in Maryland, then transferred to a

refuge in Wisconsin. They are reared by Operation Migration staff dressed in crane suits and become conditioned to follow the suited handlers and a plane engine. On the migratory route, the cranes follow a microlight flown by a pilot in a crane costume. The flock flies between 40 and 80 km a day. The birds learn the route on their inaugural migration and can make the return flight on their own. This year's flock of ten Whoopers was grounded about 800 km from their goal after a complaint to the FAA. The birds were kept in pens for three weeks while the legal wrangling ensued.

Pike are limiting factor for Slavonian Grebes

Stopping the introduction of Pike *Esox lucius* into Scottish lochs could help to ensure the future of one of Scotland's rarest birds, according to research by RSPB Scotland. The study, led by RSPB and part-funded by Scottish Natural Heritage, looked at what factors influence breeding Slavonian Grebes *Podiceps auritus* to choose certain lochs to raise young. It found that the moderately sized lochs with an abundance of small fish (sticklebacks and minnows) to feed on, clear water to hunt fish and plenty of nesting habitat were most suitable for the species.

It also revealed that lochs containing Pike had fewer small fish, which are a valuable food source for grebes. 'Slav' Grebes began breeding in the UK only in 1908 and the population today remains restricted to northern Scotland, where the latest counts have shown that only 29 breeding pairs remain.

The RSPB's Ron Summers said: 'The Slavonian Grebe is still a relative newcomer to the UK and as such we have much to learn about its behaviour and factors affecting its population size. This research helps us understand what kind of conditions are suitable for grebes when raising young. In this way, we can help ensure suitable habitat is maintained and that the species isn't competing against others, such as Pike, for food. By considering these measures, we stand a better chance of improving breeding success in the future.'

Tim Dawson, SNH South Highlands area officer, added: 'We'd all like to make sure these striking birds not only remain in the Highlands but also increase their small numbers. This study is an important first step, giving us information on how to help protect these vulnerable birds.'



Steve Knell rspb-images.com

71. Slavonian Grebe *Podiceps auritus*

Oil-spill update from New Zealand

The last two months of 2011 brought some good news for Forest & Bird (BirdLife in New Zealand) in the wake of the oil spill in October, which was the country's worst-ever maritime environmental disaster. By mid December, most of more than 400 birds – mostly Little Penguins *Eudyptula minor* and endangered New Zealand Dotterels *Charadrius obscurus* – had been released back into the wild after being cared for at an Oiled Wildlife Response Centre. The remaining birds were also expected to be released as they returned to full health and their home beaches were cleared of lingering oil pollution.

Some positive news was needed after a grim October when the Liberian-registered container ship *Rena* ran aground on Astrolabe Reef, close to Tauranga, New Zealand's busiest port, on the North Island's east coast. On 11th October, nearly a week after the grounding, around 350 tonnes of heavy fuel oil spewed from the ship's cracked hull into the Bay of Plenty. Oil quickly started washing ashore, along with the bodies of seabirds covered in the thick tar-like fuel. The 2,000 bodies eventually recovered are likely to represent only about 10% of all the birds killed, most of which would have sunk without trace at sea.

To compound the damage, the oil spill happened during the breeding season for many species, including the Common Diving-petrel *Pelecanoides urinatrix*, which made up about half of the

recovered bodies, and Fluttering Shearwaters *Puffinus gavia*, which accounted for about 20%.

Staff and members of Forest & Bird were involved in the wildlife recovery and clean-up operations in the Bay of Plenty. Hundreds of oiled penguins were found and taken to the hastily erected response centre, along with 60 uninjured New Zealand Dotterels, which were removed from the region's beaches as a precaution. The global population of the endemic New Zealand Dotterel is estimated at just 1,700 birds, including about 200 in the Bay of Plenty area. Conservationists hoped that there would be time for the released birds to reform pairs and raise chicks before the end of the breeding season in January.

Despite the devastation, the disaster would have been much worse if the ship had broken apart before the removal of about 1,300 tonnes of fuel remaining on board after the initial spill. But the ship held together, the bulk of the oil was recovered, and marine ecologists hope that the marine environment will largely recover within months.

Postscript: On 7th January the *Rena* broke in two during a violent storm and the NZ authorities are monitoring for any further oil spills.

African Bird Club awards reach £100,000

The African Bird Club Conservation Fund has reached a new milestone having awarded a total of £100,000 to bird study projects since it was launched in 1996. In that time, ABC has assisted over 120 applicants in over 30 African countries. These have ranged from bird and habitat surveys, to educational and promotional materials for use with community projects. Assistance has also been given to expeditions to poorly known areas in Africa. Usually the grants are around £750–£1,500 and are often awarded to applicants whose criteria do not match those of larger funders who work with larger projects. Applicants should normally be resident in Africa, but consideration will be given where the applicant is not in Africa but the project involves colleagues who are.

The Club is particularly grateful to a number of individual members who have offered to finance specific projects that it has selected for support. This is a hugely valuable source of assistance and allows the Club to help a larger number of groups than would otherwise have been possible. Full details of the ABC Conservation Fund are found here: www.africanbirdclub.org/club/ConsFund.html

Applications should be made by 28th February, 30th June or 31st October with a lead time of at least six months. If you would like to help the Conservation Fund or apply for project support, please e-mail: conservation_fund@africanbirdclub.org

African Bird Club annual meeting

The ABC's Annual Meeting will be held on **Saturday 28th April** at the BTO, The Nunnery, Thetford, Norfolk IP24 2PU. Non-members are welcome and invited to make a small donation. Doors open at 10.30 am. A wide range of talks will look at globally threatened birds in Africa, the challenges for Palearctic wintering birds that migrate there, news on the conservation of the Seychelles Warbler, the damage caused by Red-billed Queleas *Quelea quelea*, latest status of the Ethiopian Bush-crow *Zavattariornis stresemanni*, and birding in Eritrea – a newly emerging destination.

The 600th British Bird

In this Olympic year, with records sure to be broken in many events, there is another milestone that is tipped to be passed in 2012. With the official British List maintained by the BOURC currently standing at 596 species, the List could well hit 600 by the year's end. In the run-up to this momentous event, arguably a more Olympian achievement than a nine-second 100 m, N&c has encouraged readers to take a punt on the species that crosses the line first. The latest suggestion from reader George Brown is Purple Swamp-hen *Porphyrio porphyrio*. South Polar Skua *Stercorarius maccormicki*, suggested by Dick Newell, might be worth a bet too following recent tagging research which shows that much of the population disperses into the North Atlantic after breeding in the sub-Antarctic (see *Marine Ecology Prog. Series* 435: 263–267).

For extended versions of many of the stories featured here, and much more, visit our website www.britishbirds.co.uk

Nepalese bird observatory starts work

Following an appeal to birders worldwide, generously responded to by several *BB* readers, the Kosi Bird Observatory in Nepal has become a reality within a year. Himalayan Nature had a target of £25,000 to buy 10 ha of land north of the Koshi Tappu Wildlife Reserve (*Brit. Birds* 103: 744). At present, KBO owns 4 ha, where a small traditional house has been built for the bird observatory. There are three staff and they are already busy conducting survey work, including bird ringing at six Constant Effort Sites in the area.

Dr Hem Sagar Baral, President of Himalayan Nature, said: 'The site is now, in essence, a mini bird reserve complementing the conservation efforts achieved by the Government of Nepal when Koshi Tappu Wildlife Reserve was established to protect the rich natural heritage further down river. KBO is flanked by two Important Bird Areas, Dharan Forests to the east and Koshi Tappu and Koshi Barrage to the south. Most importantly it lies in an ideal place for studying Nepal's birds at a point where the mighty Koshi River finally opens out after meandering through the high mountains and hills of Nepal.'

The bird observatory welcomes ongoing financial assistance. Donations are being processed in the UK by the Wetland Trust. You can send cheques to: Kosi Bird Observatory, The Wetland Trust, Elms Farm, Pett Lane, Icklesham, Winchelsea, East Sussex TN36 4AH. Cheques should be made payable to The Wetland Trust and 'KBO' written on the back. UK taxpayers can also Gift Aid their donations.

Jimmy Steele CBE

Congratulations to Jimmy Steele, who was awarded a CBE in the New Year's Honours. Former BBRC stalwart (and current BOURC member) Jimmy Steele has found an outstanding series of rarities on his local patch at Newbiggin-by-the-Sea in Northumberland, including Britain's second Black-faced Bunting *Emberiza spodocephala*, in 1999. In itself, this would be sufficient to merit the award of a CBE, if not a knighthood. But, apparently, the award goes to Prof. James Steele, Dean of the School of Dental Sciences at Newcastle University, for his services to dentistry.

Announcements

New county bird recorder

Isles of Scilly Will Wagstaff, 42 Sally Port, St Mary's, Isles of Scilly TR21 0JE; e-mail will@islandwildlifetours.co.uk

Correction

In the recent paper on Caspian Gulls *Larus cachinnans* (Gibbins *et al.* 2011, *Brit. Birds* 104: 702–742), there is an error in table 3 (p. 712). For the character 'P5: extent of black', the correct figures for adult Caspian Gull should read as follows: 0=28, 1=48, 2=14, 3=9, 4=1 (not 1, 7, 14, 77, 1, as shown). We apologise for this error.

BB Bird Photograph of the Year 2012

The 36th *BB* Bird Photograph of the Year competition is free to enter and, as usual, seeks to recognise the best and/or the most scientifically interesting photographs of Western Palearctic birds taken during 2011. In addition to the main award, there is a digiscoping section. Up to three images may be submitted and, for full details of the rules and how to submit entries, go to www.britishbirds.co.uk/about/bird-photograph-of-the-year

The competition will again be sponsored by Anglian Water in 2012, to whom we remain extremely grateful for providing a cash prize of £1,000 for the overall winner. Collins, Helm/Bloomsbury and the Eric Hosking Charitable Trust will continue their long-term support of the Award too. The winning entries will be exhibited at the British Birdwatching Fair in August, where the awards will be presented.



The closing date for the 2012 competition is 1st April 2012.

Recent reports

Compiled by Barry Nightingale and Harry Hussey

This summary of unchecked reports covers early December 2011 to early January 2012.

Headlines A Dark-eyed Junco in Hampshire was an excellent midwinter find, a Lesser White-fronted Goose returned to a traditional site in Norfolk, and a Lesser Yellowlegs in Somerset continued the superb run of North American waders in autumn 2011. Otherwise, it was mostly the long-stayers that sustained the rarity interest, augmented by a small number of new arrivals.

Lesser White-fronted Goose *Anser erythropus* Buckenham Marshes (Norfolk), presumed returning bird, 27th December to at least 8th January. Ross's Goose *Anser rossii* Great Yarmouth/Sea Palling areas (Norfolk), two, long-stayers to 18th December, presumably same North Norfolk to 8th January; Burgh Marshes, 14th December, presumably same Rockliffe Marsh (both Cumbria), 28th December to 2nd January. Cackling Goose *Branta hutchinsii* Long-stayers at Ballyconnell (Co. Sligo), to at least 20th December, Torr Resr (Somerset), to 7th January, and Islay (Argyll), to 30th December, with two there 8th January. Red-breasted Goose *Branta ruficollis* Long-stayers at Exminster Marshes/Bowling Green Marsh/Topsham areas (all Devon), to 8th January, and Old Hall Marshes to 26th December, then Tollesbury Wick (both Essex), 27th December to 8th January. American Wigeon *Anas americana* Long-stayers at Dawlish Warren (Devon), to 7th January, Kirk Loch/Castle Loch (Dumfries & Galloway), to 8th January, and Anglers CP/Wintersett Resr (Yorkshire), to 8th January; Bodenham Lake (Herefordshire), 20th December to 6th January; Hesketh Out Marsh, 28th December and Clifton Marsh/Newton Marsh (all Lancashire & N Merseyside) 7th–8th January; South Uist (Outer Hebrides), 5th–6th January; Rahasane (Co. Galway), 8th January. Blue-winged Teal *Anas discors* Long-stayers at Longham Lakes (Dorset), North Bull (Co. Dublin) and St Mary's (Scilly), all to 7th January. Ferruginous Duck *Aythya nyroca* Ranworth, Malthouse and Cockshoot Broads (Norfolk), 15th–30th December; Blashford Lakes (Hampshire), 31st December to 8th January; Paxton GP (Cambridgeshire), 7th–8th January. Lesser Scaup *Aythya affinis* Long-stayers at Marden Quarry (Northumberland), to 7th January, and Wimbleball Lake (Somerset), to 26th December; Slimbridge (Gloucestershire), 13th December to 8th January; Cosmeston Lakes and Cardiff Bay (East Glamorgan), 18th December to 7th January; Lough Gill (Co. Kerry), 31st December to 2nd January; Loch Skene (North-east Scotland), 6th–8th January. King Eider *Somateria spectabilis* Burghead (Moray & Nairn), long-stayer to 30th December; Ballinskelligs (Co. Kerry), 17th–31st December. Surf Scoter *Melanitta perspicillata* Penzance (Cornwall), 17th December to 8th January; Dawlish Warren, 19th December to 8th January; Turbot Island (Co. Galway), 20th–23rd December; Gormanstown (Co. Meath), 2nd January; Garretstown (Co. Cork), 8th January. Bufflehead *Bucephala albeola* Helston Loe Pool (Cornwall), long-stayer to 8th January.

White-billed Diver *Gavia adamsii* Kirk Sound (Orkney), 12th December; Kirkabister (Shetland), 8th January.

Cattle Egret *Bubulcus ibis* Hillsborough (Co. Down), long-stayer to 19th December; Warblington (Hampshire), 18th December to 8th January; East Holme (Dorset), 20th–23rd December; Sidlesham (Sussex), 27th December; near Taunton (Somerset), five, 7th January. Great White Egret *Ardea alba* Records from Angus & Dundee, Bedfordshire (county first), Buckinghamshire, Carmarthenshire, Cheshire &



Rob Wilson

72. First-winter Western Sandpiper *Calidris mauri*, Cley, Norfolk, December 2011.

Wirral, Cumbria, Essex, Gower, Greater London, Hampshire, Kent (including a group of three), Co. Laois, Lancashire & N Merseyside, Leicestershire & Rutland, Lincolnshire, Nottinghamshire, Powys, Shetland, Somerset (including a group of five), Sussex, Warwickshire and Wiltshire. Glossy Ibis *Plegadis falcinellus* Fingringhoe Wick (Essex), long-stayer to 8th January; Leighton Moss (Lancashire & N Merseyside), 13th December to 7th January, same Arnside (Cumbria), 15th December; Grove Ferry/Stodmarsh (Kent), 17th December to 8th January, with two from 21st December; Chapel Cairn area (Cornwall), 27th December; Exminster Marshes, 28th December to 8th January; Tresco, 27th, then St Mary's, 27th December to 5th January (both Scilly); Sandbach (Cheshire & Wirral), 7th–8th January.

Pallid Harrier *Circus macrourus* Lough Corrib (Co. Galway), long-stayer to at least 5th January. Gyr Falcon *Falco rusticolus* Hoy (Orkney), 30th December.

Western Sandpiper *Calidris mauri* Cley (Norfolk), long-stayer to 8th January. Least Sandpiper *Calidris minutilla* Long-stayer, Blackrock Strand (Co. Kerry), to 19th December. Sharp-tailed Sandpiper *Calidris acuminata* Blagdon Lake/Chew Valley Lake (both Avon), long-stayer to 16th December. Wilson's Snipe *Gallinago delicata* St Mary's, long-stayer to 24th December. Long-billed Dowitcher *Limnodromus scolopaceus* Blagdon Lake/Chew Valley Lake, two long-stayers to 13th December; Kidwelly Quay (Carmarthenshire), 21st, then 27th December to 8th January; North Slob (Co. Wexford), 1st–7th January; Lodmoor (Dorset), two, 2nd–5th January; Wigtown (Dumfries & Galloway), 7th January. Spotted Sandpiper *Actitis macularius* Long-stayers at the Plym Estuary (Devon) and Chew Valley Lake, both to 8th January; Lyme Regis (Dorset), 20th December to 2nd January. Greater Yellowlegs *Tringa melanoleuca* East Chevington/Hauxley/Druridge Bay (all Northumberland), long-stayer to 12th December; Loch Fleet (Highland), 14th December to 7th January. Lesser Yellowlegs *Tringa flavipes* Burnham-on-Sea (Somerset), 31st December to 8th January.

American Herring Gull *Larus smithsonianus* Youghal dump (Co. Cork), 17th December. An exceptional influx of white-winged gulls was apparent in early January, mainly in the northern and western extremities. Totals for Britain & Ireland probably comfortably exceeded 550 Iceland Gulls *Larus glaucoides* and 220 Glaucous Gulls *Larus hyperboreus* (www.birdguides.com). In Shetland, there were at least 152 Iceland Gulls on 14th January, while in Ireland there were peak counts of 25 Glaucous and 31 Iceland Gulls at Killybegs (Co. Donegal) on 8th January. Small numbers of Kumlien's Gulls *L. g. kumlieni* were also reported. Bonaparte's Gull *Chroicocephalus philadelphia* Long-stayer, Ballygally (Co. Antrim), to 8th January. Forster's Tern *Sterna forsteri* Long-stayer, Galway Bay (Co. Galway), to 7th January.

House Crow *Corvus splendens* Cobh (Co. Cork), long-stayer to 7th January. Penduline Tit *Remiz pendulinus* Dungeness (Kent), long-stayer to 28th December. Pallas's Leaf Warbler *Phylloscopus proregulus* Trevose Head (Cornwall), 25th December. Hume's Warbler *Phylloscopus humei* Wyke Regis (Dorset), long-stayer to 8th January. Dusky Warbler *Phylloscopus fuscatus* St Mary's, at least one long-stayer to 1st January. Rose-coloured Starling *Pastor roseus* Newquay (Cornwall), 7th January. Desert Wheatear *Oenanthe deserti* Long-stayers Bempton Cliffs (Yorkshire), to 8th January, Newbiggin (Northumberland), to 3rd January, and Lerwick (Shetland), to 15th December. Buff-bellied Pipit *Anthus rubescens* Long-stayer, Ballinclamper/Clonea (Co. Waterford), to at least 20th December. Arctic Redpoll *Carduelis hornemanni* Titchwell, long-stayer to 8th January, another at Kelling (both Norfolk), 8th January. Dark-eyed Junco *Junco hyemalis* Hawkhill Inclosure (Hampshire), 24th December to 8th January. Northern Waterthrush *Parkesia noveboracensis* Long-stayer again St Mary's, 7th–8th January.



Stef McElwee

73. Male Desert Wheatear *Oenanthe deserti*, Newbiggin, Northumberland, December 2011.



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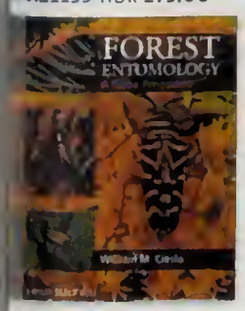
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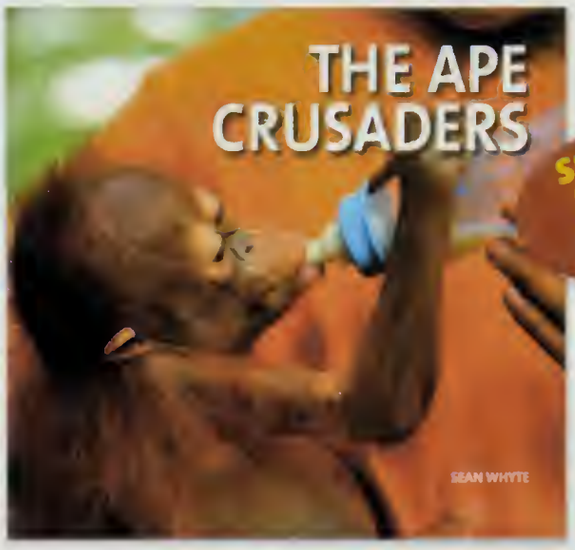
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